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TRANSACTIONS

OF THE

IOWA STATE MEDICAL SOCIETY

VOLUME XXI

FIFTY-SECOND ANNUAL SESSION
1903

COUNCIL BLUFFS, IOWA
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W. B. SMALL, - - - - - - - - Waterloo
A. M. POND, - - - - - - - Webster City
J. W. COKENOWER, - - - - - Des Moines

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IOWA STATE MEDICAL SOCIETY,
1902-1903.

President, - - JAMES TAGGART PRIESTLY, Des Moines
First Vice-President, - - WILHELM JEPSON, Sioux City
Second Vice-President, - C. F. WAHRER, Fort Madison
Secretary, - - - V. L. TREYNOR, Council Bluffs
Assistant Secretary, - - - W. W. DEAN, Sioux City
Treasurer, - - - - - W. B. SMALL, Waterloo

CHAIRMEN OF SECTIONS.

Practice of Medicine—H. C. Eschbach, Albia.
Ophthalmology and Otology—L. W. Dean, Iowa City.
Surgery—Gilbert G. Cottam, Rock Rapids.
Mental and Nervous Diseases—Clifton Scott, Des Moines.
State Medicine and Hygiene—F. W. Powers, Waterloo.
Obstetrics—A. J. Hobson, Hampton.
Gynaecology—Oscar Fordyce, Guthrie Center.
Materia Medica—W. E. Harriman, Ames.

TRUSTEES.

TERM EXPIRES 1904.

C. F. Wahrer, Keokuk.
D. M. Wick, Cedar Falls.

TERM EXPIRES 1905.

Gershom H. Hill, Des Moines.
F. C. Mehler, New London.

TERM EXPIRES 1906.

G. G. Cottam, Rock Rapids.
D. W. Finlayson, Des Moines.

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COMMITTEES.

CONSTITUTION AND BY-LAWS.

D. S. Fairchild, Sr., Clinton; W. J. Findley, Sac City; Van Buren Knott, Sioux City.

FINANCE.

G. R. Skinner, Cedar Rapids; F. E. Sampson, Creston; G. C. Moorhead, Ida Grove.

ETHICS.

J. R. Guthrie, Dubuque; Charles P. Bowen, Centerville; H. B. Young, Burlington; J. M. Ristine, Cedar Rapids; D. Macrae, Sr., Council Bluffs.

PUBLICATION.

J. W. Cokenower, Des Moines; J. W. Kime, Fort Dodge; W. B. Small, *ex-officio*, Waterloo; V. L. Treynor, *ex-officio*, Council Bluffs.

LEGISLATION.

D. H. Bowen, Waukon; E. E. Dorr, Des Moines; J. M. Emmert, Des Moines; D. C. Brockman, Ottumwa; D. J. Townsend, Lohrville.

LIBRARY.

H. B. Jennings, Council Bluffs; Charles McAllister, Spencer; R. H. Hews, Rockwell City; A. J. Hobson, Hampton; V. L. Treynor, Council Bluffs.

NECROLOGY.

First District—J. Fred Clarke, Fairfield.
Second District—W. L. Allen, Davenport.
Third District—D. M. Wick, Cedar Falls.
Fourth District—George Kessel, Cresco.
Fifth District—J. DeWitt Graham, Springville.
Sixth District—A. O. Williams, Ottumwa.
Seventh District—A. R. Amos, Des Moines.
Eighth District—C. F. Brown, Centerville.
Ninth District—F. W. Porterfield, Atlantic.
Tenth District—L. G. Patty, Carroll.
Eleventh District—R. E. Conniff, Sioux City.

ARRANGEMENTS.

J. N. Warren, Chairman, Sioux City.

ENTERTAINMENT AND RECEPTION.

Van Buren Knott, Sioux City; Wilhelm Jepson, Sioux City; F. A. Powell, Sioux City.

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OFFICERS OF THE
IOWA STATE MEDICAL SOCIETY,
1903-1904.

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Second Vice-President, - - D. M. WICK, Cedar Falls
Secretary, - - - V. L. TREYNOR, Council Bluffs
Assistant Secretary, - - - F. A. ELY, Des Moines
Treasurer, - - - - W. B. SMALL, Waterloo
Member of the House of Delegates, - S. BAILEY, Mt. Ayr
Chairman of Local Councilors, - - - E. E. DORR

LOCAL COUNCILORS

First District—C. E. Ruth, Keokuk.
Second District—W. L. Bierring, Iowa City.
Third District—D. W. Crouse, Waterloo.
Fourth District—D. Eggloff, Mason City.
Fifth District—G. E. Crawford, Cedar Rapids.
Sixth District—D. C. Brockman, Ottumwa.
Seventh District—E. E. Dorr, Des Moines.
Eighth District—F. E. Sampson, Creston.
Ninth District—J. M. Emmert, Atlantic.
Tenth District—C. H. Churchill, Fort Dodge.
Eleventh District—E. Hornibrook, Cherokee.

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FIFTY-SECOND ANNUAL SESSION

OF THE

Iowa State Medical Society

HELD AT

Sioux City, Iowa, April 15, 16 and 17, 1903.

First Day, Wednesday, April 15.

MORNING SESSION.

The Society met in the auditorium of the Young Men's Christian Association, and was called to order at 10:20 a. m. by the president, Dr. James Taggart Priestley, of Des Moines.

Prayer was offered by the Right Reverend P. J. Garrigan, of Sioux City.

In the absence of Hon. E. W. Caldwell, mayor of Sioux City, the address of welcome by Mayor Caldwell was read by Mr. L. V. Robinson, of Sioux City, as follows:

ADDRESS OF WELCOME BY MAYOR CALDWELL.

My Dear Fellow Physicians of the Iowa Medical Society:

Perhaps it would be more appropriate if this welcome on your visit to Sioux City were to be expressed by somebody not so prominently identified with our noble profession as I am myself—since having been made a lay member of the Medical Society of the Missouri Valley.

To listen to a doctor's greeting on this occasion must seem a great deal as if one of your own family would get up and sling a formal salutation at you every time you arrived at your own home. But Sioux City is determined that you shall be given to understand how she appreciates your choice of locality for the year's meeting, and it so happens that the privilege of being her mouthpiece falls upon me.

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I wish I could remember all the tributes I paid to the medical profession last year, when I welcomed the Medical Society of the Missouri Valley. I'd like to say them over again were I not a member of the profession. But won't you, just for a moment, forget that I am a doctor? Let me speak my real sentiments of tribute, and say why it must inevitably be the case that Sioux City has a specially cordial welcome.

I said last year, and I say again this year, that in the homes of Sioux City, as in the homes of all the civilized world, there is no one for whom there is a more cordial welcome than for the family physician when a loved one is stricken, and in the hands of that physician perhaps lies the arbitrament of the strife between life and death. That being true, is there any danger of anybody exaggerating the welcome which Sioux City as a community has, or which any other community would have, for the Iowa State Medical Society as an aggregation of physicians and surgeons, assembled to help in the strife against disease and death.

I remember that a while ago this Society celebrated its semi-centennial. What wonderful progress in the Hawkeye state it has witnessed since its birth. The population of less than 200,000 has been multiplied by twelve. There are churches enough to put one on every hill top, and school houses enough to put one in every valley. Out of all the hundred counties, there is not one without a railroad—while when I came to Iowa, in 1856, I rode by stage from Iowa City to Boonesboro.

Not the least marvel of these years of Iowa's history is that such a metropolis as Sioux City could have been built way out here in what was an unknown land when your founders were organizing this Society—a city having now a population equal to one-fourth of the population of the whole state in 1850—a city that handles every season more cattle and hogs than the total output of the entire state fifty years ago—a city with more manufactories and jobbing houses than all Iowa could boast at the time your Society was born, or for many years after.

You will understand, of course, that I don't speak of these things to give Sioux City any special boost—we up here are too modest for that—but merely to emphasize the progress the Iowa

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State Medical Society has seen in this great commonwealth of ours.

But whatever your Society may have seen in the way of progress of the Hawkeye state, it has seen very much more progress in the science of medicine. It has seen the average longevity of human life in the United States increase from something over thirty years to something over thirty-five years. Why —but think of it—at the time this Society was organized there wasn't in any city in the world anything like proper and effective public works for drainage and water supply. Not until fifteen years later did any city of the United States have a local board of health, and now not only every city, but every town and even every township in every county in Iowa, has such a board.

Not until this Society was twenty years old was there anywhere in this union a state board of health. Not until it was thirty years old was there a national board of health. Prior to creations of local boards of health, there was practically no isolation of contagious or infectious diseases, and but little attention to preserving water supplies from infection. Quarantine consisted merely in efforts at keeping contagious diseases from being imported into cities, but scarcely any attention was given to preventing spread of such diseases as might develop inside the limits.

Compare that with what is required today everywhere in the way of official quarantine.

And let it be remembered that in all these varied movements of the past fifty years, for improved sanitation and for the isolation of contagion and infection, by which the average of human life has been increased so remarkably, it has been the medical profession that was the real power that inaugurated them and carried them to their present stage of efficiency. And the medical profession would have been powerless had it not been that its members combined and consolidated and organized into such associations as the Iowa State Medical Society.

Furthermore, the Society was twenty years old before anybody even suggested that micro-organisms have anything to do with causing disease, since which time the whole range of the germ theory has developed. From this theory has come the

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great general practice of preventive medicine. In it is included antiseptic surgery, which has made possible a large number of operations that otherwise could never be undertaken, and later has come treatment by antitoxin for both the prevention and the cure of specific contagious and infectious diseases.

And the Iowa State Medical Society has seen all these wonderful triumphs in therapeutics. It has seen, likewise, the development of the general use of anesthetics—for it probably is true that prior to the first meeting of the Society chloroform had never been administered in the United States. It has seen the blind and deaf cured; congenital deformities of the limbs corrected; pressures on the brain located and removed, giving relief from paralysis or nervous affections; calculi taken from the kidneys as well as from the bladder; abdominal tumors removed; appendicitis cured, and so on through an enormous list.

But I must stop attempts at enumerating the things this Society has seen in the way of development in medical science. The last century saw more progress than had been made in the preceding two thousand years, and nearly all of that progress was after the birth of this organization. Nevertheless, not anywhere on the Society is to be seen a single mark of age. It still is in the pristine and luxuriant vigor of its early summertime. And if it can have seen so much already, who will attempt to forecast the things it still is to be permitted to witness? We of Sioux City most earnestly hope the Society may avail itself of frequent opportunity to see us and let us see it. (Applause).

Dr. James R. Guthrie, of Dubuque, was introduced, and responded to the address of welcome.

RESPONSE TO ADDRESS OF WELCOME.

Mr. Robinson:

On behalf of the Iowa State Medical Society, it affords me great pleasure to thank you sincerely for the hearty and generous welcome you have given us to this goodly city—this city, located upon the western boundary of the best and the brightest empire upon which the sun shines; this city located upon the western boundary of an empire comprising fifty-five thousand square miles of tillable territory; traversed by a perfect network

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of splendid railways; dotted all over with prosperous and beautiful cities; inhabited by two and a half million of intelligent people—located thus on this boundary, it is a city which is noted for its energy and thrift; a city of splendid commercial achievements; a city of palatial homes and hospitable in the extreme; a city we have had the pleasure of visiting in the past, and whose hospitality we have successfully tested, and we come here confident that the welcome you have so kindly and generously expressed will be fully exemplified by our stay among you. (Applause).

With the memories of '87, and the auspicious opening of this convention, we feel like saying, we ask no better than a Sioux City welcome and entertainment. On behalf of this Society, to you and her people, we thank you most heartily for the address of welcome. (Applause).

Dr. John P. Savage, of Sioux City, made the following verbal report as a member of the Committee of Arrangements:

REPORT OF COMMITTEE OF ARRANGEMENTS.

Members of the Iowa State Medical Society:

On behalf of the Committee of Arrangements, I desire to say that all the members of the Society may wear the official emblem, which is a button, but it can only be procured by paying dues at the Treasurer's desk. This emblem will be recognized by the clubs of the city. These clubs will be open to the members and guests at any time.

At 2:30 this afternoon. the visiting ladies are requested to meet the committee of Sioux City ladies at the Hotel Garretson. with a view to taking a trip to Riverside.

At twelve o'clock tomorrow noon, the visiting ladies are requested to meet again this committee of ladies of Sioux City at the Hotel Garretson, where they will take carriages and have a progressive lunch furnished by the ladies of Sioux City.

A banquet will be given at the Hotel Mondamin this evening for the members of the Society at 10 o'clock.

The President invited all ex-Presidents who were present to take seats on the platform.

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The first order of business was the report of absentees.

The Secretary stated that he had received no letters from absentees.

The Secretary read the following resolution:

To the Officers and Members of the Iowa State Medical Society:

WHEREAS, Recognizing the large number of dependent epileptics in the state, and their unfortunate and deplorable condition; also taking into consideration the position which they occupy in the home and society, and the fact of their being ostracized from both in a large degree and becoming inmates of poorhouses, jails and insane asylums, where they are indifferently cared for and no effort made to better their condition, either physically or otherwise, and the tendency of such cases to go from bad to worse; recognizing, further, that a per cent. of such cases are curable or semi-curable, so much so that they may become self-supporting; be it

Resolved, That it be the sense of the State Medical Society of Iowa, that a committee shall be appointed to present to the coming legislature a bill to establish an institution by the state for the care of these patients.

(Signed.) F. H. LITTLE,
T. F. BEVERIDGE,
Committee of the Muscatine County Medical Society.

The President stated that if there was no objection, this resolution would be referred to the Committee on Legislation. There being no objection, it was so referred.

The Secretary read the following resolution from the Muscatine County Medical Society relative to the establishment of sanatoria for tuberculosis:

April 3, 1903.

To the Officers of the State Medical Society:

WHEREAS, Recognizing the advance in the control of tuberculosis, both in foreign countries and in our own, by the establishing of sanatoria; and recognizing that other states have taken up the work of isolating and caring for this class of patients, we offer the following resolution:

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Resolved, That it be the sense of this Society that the State Medical Society appoint a committee who shall have the matter of securing from the legislature of the state of Iowa, at its session in 1904, an appropriation for the purpose of building and maintaining a hospital for the tuberculous poor; and that we further instruct the President and Secretary to forward this recommendation to the Secretary of the State Society.

(Signed.) H. M. DEAN, President.
T. F. BEVERIDGE, Secretary.

This resolution was referred to the Committee on Medical Legislation.

The Secretary read the following communication from the Sioux Valley Medical Association:

March 3, 1903.

WHEREAS, Recognizing the advance in the control of tuberculosis, both in foreign countries and in our own, by the establishment of sanatoria; and recognizing that other states have taken up the work of isolating and caring for this class of patients, we offer the following resolution:

Resolved, That it be the sense of this Society that the State Medical Society appoint a committee who shall have the matter of securing from the legislature of the state of Iowa, at its session in 1904, an appropriation for the purpose of building and maintaining a hospital for the tuberculous poor; and that we further instruct the President and Secretary to forward this recommendation to the Secretary of the State Society.

(Signed.) M. E. SILVER.

Referred to the Committee on Legislation.

The Secretary read the following from the Muscatine County Medical Society:

April 3, 1903.

At a meeting of the Muscatine County Medical Society, held April 3, 1903, a copy of the resolutions adopted by the Sioux Valley Medical Society was presented and unanimously adopted. These resolutions, relating to the establishing of a sanatoria for the care of the tuberculous poor, I am instructed to forward to

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you to be presented to the State Medical Society at its coming session, along with resolutions of a like nature from other societies throughout the state.

The subject of the proper care of another unfortunate class of sufferers, the epileptic patients, was discussed, and a resolution looking to the establishing of a state institution or colony for this purpose was passed, and I am likewise instructed to forward this resolution to you, and ask that it be presented to the State Medical Society at its coming meeting.

(Signed.) T. F. BEVERIDGE,
Secretary Muscatine County Medical Society.

Referred to the Committee on Medical Legislation.

The President called for the report of the Committee on Publication.

Dr. Cokenower, of Des Moines, a member of the committee, asked for further time, which was granted.

The President called for the report of the Committee on Expert Testimony. The Secretary stated that there was no such committee.

The Secretary read the report of the Committee on Necrology, as follows:

Fourth District—No deaths.

Ninth District—No deaths.

Tenth District—Dr. L. G. Kinney, Humboldt, Iowa, died July, 1902 Dr. I. L. Welch, Humboldt, Iowa, died January, 1903; was graduate of the University of Wooster Medical Department, Cleveland, Ohio.

The President announced that the members of the various districts would meet at the close of the morning session for the purpose of making nominations for their respective congressional districts.

On motion, the Society then adjourned until 1:30 p. m.

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AFTERNOON SESSION.

The Society reassembled at 1:30 p. m., and was called to order by the President.

The Committee on Nominations was announced as follows:
First District—Dr. Geo. F. Jenkins, Keokuk.
Second District—Dr. L. W. Dean, Iowa City.
Third District—Dr. James R. Guthrie, Dubuque.
Fourth District—Dr. J. F. Cole, Oelwein.
Fifth District—Dr. John Hamilton, Cedar Rapids.
Sixth District—Dr. H. C. Eschbach, Albia.
Seventh District—Dr. E. L. Stevens, Des Moines.
Eighth District—Dr. S. Bailey, Mount Ayr.
Ninth District—Dr. Donald Macrae, Jr., Council Bluffs.
Tenth District—Dr. J. A. Finlayson, Armstrong.
Eleventh District—Dr. R. E. Conniff, Sioux City.

At this juncture, Dr. C. F. Wahrer, of Fort Madison, took the chair, and President Priestley delivered his annual address.

At the conclusion of the President's address, Dr. G. G. Cottam, of Rock Rapids, moved that the chair appoint a committee of three to act on the President's address. Carried.

The President appointed on this committee Drs. D. W. Crouse, Waterloo; D. C. Brockman, Ottumwa, and G. G. Cottam, Rock Rapids, and stated that the committee would make its report at the opening of tomorrow afternoon's session.

The following is a list of the members elected at the Sioux City meeting, April 15-17, 1903:

NEW MEMBERS, 1903.

Robt. Robb, Hiteman.
Winafred A. Y. Robb, Hiteman.
L. J. Harvey, Storm Lake.
F. T. Seybert, Council Bluffs.
Alexis M. Warren, Sioux City.
W. E. Robinson, Oelwein.
D. T. Martin, Pomeroy.
Bessie L. Efner, Hinton.
J. C. Edgar, Holstein.

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L. A. Westcott, Cherokee.
W. P. Roberts, Cleghorn.
G. S. Waterhouse, Charter Oak.
S. E. Sibley, Moville.
H. S. Gillespie, Mapleton.
A. N. Sloan, Leeds.
R. R. Raessle, Anthon.
Clara L. Kimbel, Bloomfield.
Guy C. Rich, Sioux City.
Minerva Porter Wertz, Spencer.
P. E. Sawyer, Sioux City.
D. Rust, Whiting.
J. C. McMahon, Sioux City.
J. A. Dales, Sioux City.
P. B. McLaughlin, Sioux City.
H. Bailey, Charles City.
F. J. Huizenga, Rock Valley.
W. A. Quigley, Hawarden.
J. P. Savage, Sioux City.
J. E. Garver, Sioux City.
E. A. Hoefer, Reinbeck.
J. W. McLean, Fayette.
G. C. Giles, Marne.
E. W. Parker, Sutherland.
N. J. Rice, Council Bluffs.
E. E. Fisher, Rodney.
R. H. Parker, Storm Lake.
W. E. Sanders, Alta.
A. C. Phillips, Sioux City.
J. H. Burlingame, Cherokee.
Wm. N. Fry, Marcus.
C. Hostetler, Marcus.
Miss Katharyn Keith, Panora.
W. T. Schwabland, Lester.
J. F. Bratt, Doon.
J. H. Robbins, Sioux City.
Earnest Hileman, Ida Grove.
J. H. Hutchins, Hampton.

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W. E. Ely, Ocheyedan.
F. W. Dean, Council Bluffs.
Geo. Mogridge, Glenwood.
W. R. Ream, Granville.
Geo. V. Ellis, Akron.

For list of members attending the meeting see list of permanent members in back of book. Those marked with * being present at this session.

SECTION.

Practice of Medicine.

Chairman Dr. H. C. Eschbach, of Albia, presented his report, which was received, and referred to the Committee on Publication.

The President stated that if there were no objections, all papers that were read would be referred to the Committee on Publication without motion.

Papers were then read as follows:

Dr. Edward L. Rohlf, of Waterloo, read a paper entitled "Functional Albuminuria," which was discussed by Drs. E. J. Waddey and Walter A. Bierring.

Dr. E. L. Stevens, of Des Moines, read a paper on "Acute Parenchymatous Nephritis."

Dr. Walter L. Bierring, of Iowa City, contributed a paper on "The Contracted Kidney and Its Clinical Significance."

These two papers were discussed jointly. The discussion was opened by Dr. W. B. La Force, and continued by Drs. C. F. Wahrer, M. Bannister, J. H. Robinson, Walter C. Fraser, Walter E. Scott, Clifton Scott, T. J. Maxwell, and the discussion closed by the essayists.

Dr. C. H. Churchill, of Fort Dodge, read a paper on "Nephrolithiasis," which was discussed by Drs. D. C. Brockman and J. P. Crawford.

Dr. Albertus J. Burge, of Iowa City, read a paper on "Heart Affections, and Their Relation to the Respiratory System."

Discussed by Drs. J. R. Guthrie, Walter L. Bierring, C. F. Wahrer, and, in closing, by the essayist.

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Dr. Walter E. Scott, of Adel, read a paper entitled "Sounds Occurring in the Body."

On motion, the Society adjourned until 7 p. m.

EVENING SESSION.

The Society reassembled at 7 p. m., and was called to order by the President.

The President called for the report of the Committee on Medical Legislation.

This report was postponed.

SECTION.

Ophthalmology and Otology.

The chairman, Dr. L. W. Dean, of Iowa City, presented his report.

Dr. Robert M. Lapsley, of Keokuk, read a paper entitled "Chronic Otorrhea."

Dr. H. B. Gratiot, of Dubuque, followed with a paper entitled "Ossiculectomy and Curettement in the Treatment of Chronic Otorrhea."

Dr. A. R. Amos, of Des Moines, read a paper on "The Radical Operation in Cases of Chronic Otorrhea."

The discussion on these papers was deferred until after the reading of the next paper by Dr. Casey A. Wood, of Chicago, by invitation, entitled "The Preparatory Treatment of the Patient in Cataract Extraction."

The paper of Dr. Wood was discussed by Drs. L. W. Dean, Ira K. Gardner, R. M. Lapsley, A. J. Burge, and the discussion closed by Dr. Wood.

On motion of Dr. Small, of Waterloo, a vote of thanks was extended to Dr. Wood for his excellent paper.

The discussion on the symposium on "Chronic Otorrhea" was then taken up. It was opened by Dr. C. M. Robertson, and continued by Drs. Harold Bailey, Walter Fraser, L. W. Dean,

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W. B. Small, R. M. Lapsley, Casey A. Wood, and, in closing, by the essayists.

On motion, the Society then adjourned until Thursday, at 9 a. m.

Second Day, Thursday, April 16.

MORNING SESSION.

The Association met at 9:23 a. m., and was called to order by the President.

Prayer was offered by Rev. R. M. McKaig, of Sioux City.

SECTION.

Surgery.

The chairman, Dr. G. G. Cottam, presented his report, which was entitled "Some Phases of Cranial Surgery."

Dr. Edward Hornibrook, of Cherokee, read a paper entitled "Disinfection and Asepticism in the Office of the General Practitioner."

Discussed by Drs. A. M. Pond. D. C. Brockman, E. H. King, and, in closing. by the essayist.

Dr. A. L. Wright. of Carroll, Iowa, read a paper on "Differential Diagnosis Between Gastric Ulcer and Gall Stones."

Dr. Frank C. Davis. of Des Moines, followed with a paper on "The Surgery of the Gall Bladder and Bile Ducts."

These two papers were discussed jointly by Drs. C. F. Wahrer, T. J. Maxwell, G. R. Skinner, Donald Macrae, and the discussion closed by the essayist.

Dr. Walter L. Bierring, of Iowa City, offered the following resolution, which was adopted and referred to the Committee on Medical Legislation:

WHEREAS, There is an urgent need in this state for a bacteriological laboratory in connection with the Iowa State Board of Health, which will place its work on a scientific basis, and

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greatly promote the efficiency of the board in the proper control of infectious diseases; therefore, be it

Resolved, That the Iowa State Medical Society endorses and recommends the establishment of this laboratory by the Iowa legislature at its next session.

SECTION.

Mental and Nervous Diseases.

The chairman, Dr. Clifton Scott, of Des Moines, read his report, entitled "The Growing Importance of Neurology, and Some Diagnostic Points," after which the Society, on motion, adjourned until 1:30 p. m.

AFTERNOON SESSION.

The Society reassembled at 1:30 p. m., and was called to order by the President.

The first thing in order was the report of the Committee on the President's Address, which was read by Dr. D. W. Crouse, of Waterloo, a member of the committee, as follows:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The President's address, referred to your committee for consideration, and to which you have listened, could not but impress you with the fact that much time, ability, and well directed effort was spent in the resume given of the progress of medicine, especially during the last quarter of a century. This history will repay a careful perusal in our leisure moments. It will be reassuring to the young practitioner of medicine entering upon his chosen profession to know that the ranks are not overcrowded in Iowa; that thorough preparation and close application to duty will insure a livelihood; that the average income of those who, from necessity or choice, settled in the smaller villages and country districts is the equal, if not greater, than those who have settled in the larger towns and cities.

The necessity for reciprocal relations in the several states should be continually emphasized until the requirements of the

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several states are equalized, and the right to practice medicine, when once granted, should be as national as the flag.

The standard fixed for the entrance of students to our colleges, and the requirements of the curriculum, should be enforced both in letter and spirit, and laxness in this regard should be condemned and corrected.

To secure proper legislation, requires a united effort by the chosen four thousand, and the recommendation of the President to select the most needed and necessary laws, and not ask for too much at a time, and then place the necessary aid, in the shape of an adequate fund, at the disposal of the Legislative Committee, meets with our hearty approval.

That the county society should be the judge of the qualifications of its members for admission into the home society seems practical and just.

That the county society should be the unit to make up the larger bodies from is contemplated. To encourage the membership to unite with the State and National associations should be the aim and purpose of all the members of the State Society.

To make the affiliations with these societies obligatory, and the paying of these fees for State and National societies conditional for retaining their membership in the county society, might tend to deplete the membership rather than increase it. To have such step voluntary from County to State and State to National associations, and the advantages of such a course should be enthusiastically presented and made as enticing as possible, that the larger shall receive the greater benefits, making a powerful, united, enthusiastic body of professional men.

(Signed.) D. W. CROUSE,
D. C. BROCKMAN,
G. G. COTTAM,
Committee.

The chair stated that there was no action necessary on this report.

Dr. John Hamilton presented the report of the Nominating Committee, as follows:

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REPORT OF COMMITTEE ON NOMINATIONS.

Mr. President and Members of the Iowa State Medical Society.

GENTLEMEN: Your Nominating Committee beg leave to submit the following report: Primarily, we wish to congratulate the Society upon the class of men brought forward this year, knowing that they will continue, and even improve, the good work and standing of our Society. And secondarily, to congratulate you upon the perfect harmony existing this year.

The nominations were unanimous in every instance, as follows:

President—J. A. Scroggs, of Keokuk.

First Vice-President—Donald Macrae, Jr., of Council Bluffs.

Second Vice-President—D. M. Wicks, of Cedar Falls.

Secretary—V. L. Treynor, of Council Bluffs.

Assistant Secretary—F. A. Ely, of Des Moines.

Treasurer—W. B. Small, of Waterloo.

Trustees—G. G. Cottam, of Rock Rapids; D. W. Finlayson, of Des Moines.

Member of the House of Delegates—S. Bailey, Mt. Ayr, two years.

Chairman of Local Councilors—E. E. Dorr.

COMMITTEES.

Constitution and By-Laws—D. S. Fairchild, Sr., Clinton; H. C. Eschbach, Albia; Van Buren Knott, Sioux City.

Finance—G. R. Skinner, Cedar Rapids; F. E. Sampson, Creston; J. P. Crawford, Davenport.

Ethics—J. T. Priestley. Des Moines; C. S. James, Centerville; H. B. Young, Burlington; J. M. Ristine, Cedar Rapids; E. L. Stevens, Des Moines.

Publication—V. L. Treynor, chairman, Council Bluffs; W. B. Small, Waterloo; A. M. Pond, Webster City; J. W. Cokenower, Des Moines.

Legislation—D. C. Brockman, chairman, Ottumwa; D. H. Bowen, Waukon; E. E. Dorr, Des Moines; J. M. Emmert, Atlantic; D. J. Townsend, Lohrville.

Library—L. W. Dean, chairman, Iowa City; Charles McAllister, Spencer; A. A. Anderson, Estherville; A. J. Hobson, Hampton; J. A. Finlayson, Armstrong.

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Necrology—First district, R. M. Lapsley, Keokuk; Second district, W. L. Allen, Davenport; Third district, I. S. Biglow, Dubuque; Fourth district, Ira K. Gardner, chairman, New Hampton; Fifth district, J. DeWitt Graham, Springville; Sixth district, W. B. La Force, Ottumwa; Seventh district, C. Priestley, Des Moines; Eighth district, H. E. W. Barnes, Creston; Ninth district. F. W. Porterfield, Atlantic; Tenth district, L. G. Patty, Carroll; Eleventh district, A. J. McLaughlin, Sioux City.

Arrangements—W. W. McCarthy, chairman, Des Moines.

Dr. Cokenower, of Des Moines, moved that the report of the Committee on Nominations be received. Seconded and carried.

The President stated that if there was no objection, the rules of the Society would be suspended, and the Secretary instructed to cast the ballot of the Society for the various officers named in the report. There being no objection, it was so ordered.

Mr. C. N. Jepson, of Sioux City, read a paper (by invitation) entitled "The Best Way to Test the Claim of Insanity as a Defense for Crime."

This paper was discussed by Drs. C. F. Wahrer, A. J. Hobson, Frank A. Ely, D. C. Brockman, D. W. Crouse, W. Van Werden, Clifton Scott, and the discussion closed by Mr. Jepson.

On motion of Dr. Clifton Scott, a vote of thanks was extended to Mr. Jepson for the presentation of his able paper.

Dr. Frank A. Ely, of Des Moines, read a paper on "Traumatic Neuroses."

Dr. Gershom H. Hill, of Des Moines, read a paper entitled "Epilepsy, Its Nature and Treatment."

The discussion on the paper of Dr. Hill was postponed until after the reading of the report of the Committee on Ethics by Dr. James R. Guthrie, of Dubuque.

REPORT OF THE COMMITTEE ON ETHICS.

Mr. President: Your Committee on Ethics desires to present the following report:

1. That the charge of unprofessional conduct against Dr.

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C. H. Nims, of Cedar Falls, Iowa, case is referred to new committee of your Society.

2. That the charges preferred against Dr. E. L. Baker, of Indianola, and Dr. R. E. Everhart, of Clinton, be referred to the respective county societies of which these men are members for action.

3. *Resolved*, That inasmuch as the charges preferred by Dr. O. P. Thompson, and endorsed unanimously by resolution of Butler County Medical Society, against Dr. W. H. Smith, a member of the Iowa State Medical Society, and of most serious character, and the evidence as to the main facts is not conclusive, the committee recommends the appointment of a special committee of two, not members of this committee or of the Butler County Medical Society, who shall spend at least one day on the ground, and for whom the sum of ten dollars each for expenses shall be appropriated

(Signed.) J. R. GUTHRIE,
H. B. YOUNG,
J. M. RISTINE,
C. P. BOWEN.

At the conclusion of the report, Dr. Guthrie moved its adoption, and that it be referred to the Board of Trustees, inasmuch as it involves the expenditure of money. Seconded and unanimously carried.

The discussion on the paper of Dr. Hill was then proceeded with. The paper was discussed by Drs. J. G. Biller, E. H. Mallory, E. H. King, W. A. Rohlf, and the discussion closed by Dr. Hill.

SECTION.

Obstetrics.

The chairman, Dr. A. J. Hobson, of Hampton, read his report.

Dr. A. M Pond, of Webster City, read a paper entitled "Normal Labor Considered from a Surgical Standpoint."

Discussed by Drs. F. W. Powers, J. R. Guthrie, J. G. Evans, and the discussion closed by the essayist.

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Dr. W. A. Rohlf, of Waverly, followed with a paper entitled "Forceps and Other Mechanical Aids in Obstetrics; Their Use and Abuse."

On motion, the Society then adjourned until 7 p. m.

EVENING SESSION.

The Society reassembled at 7:30 p. m., and was called to order by the President.

SECTION.

State Medicine and Hygiene.

The chairman, Dr. F. W. Powers, of Waterloo, read his report.

Dr. Walter L. Bierring, of Iowa City, read a paper on "State Bacteriological Examinations as a Diagnostic Aid for the Control of Infectious Diseases."

Dr. F. F. Wesbrook, of Minneapolis, Minn., read a paper, by invitation, entitled "The Laboratory in Public Health Work."

These papers were discussed by Drs. C. F. Wahrer, D. C. Brockman, and the discussion closed by the essayists.

On motion of Dr. Walter L. Bierring, a vote of thanks was extended to Dr. Wesbrook for his excellent paper.

On motion, the Society adjourned until Friday morning, at 9 o'clock.

Third Day, Friday, April 17.

MORNING SESSION.

The association met at 9 a. m., and was called to order by the President.

Prayer was offered by the Rev. E. P. Smith, of Sioux City.

SECTION.

Gynaecology.

The chairman, Dr. Oscar Fordyce, of Guthrie Center, read his report.

Dr. Wilton McCarthy, of Des Moines, read a paper entitled "Diseases of the Fallopian Tubes."

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Dr. D. C. Brockman, of Ottumwa, read a paper entitled "Therapeutics of Retrodisplacement of the Uterus," which was discussed by Dr. McCarthy.

The President called for the report of the Committee on Medical Legislation.

Dr. D. C. Brockman stated that there was nothing to report by this committee.

Dr. Van Buren Knott, of Sioux City, read a paper entitled "Radical Versus Palliative Measures in Gynaecology."

The paper was discussed by Drs. W. A. Rohlf, A. L. Wright, and the discussion closed by the essayist.

Dr. Donald Macrae, Jr., of Council Bluffs, read a paper entitled "Extrauterine Pregnancy, With a Report of Two Pregnancies in One Woman."

Discussed by Drs. D. C. Brockman, Crayke Priestley, Van Buren Knott, and the discussion closed by the essayist.

Dr. C. O. Sones, of Panora, read a paper on "The Management of Certain Gynaecological Neuroses."

Dr. C. H. Churchill, of Fort Dodge, presented the following which was referred to the Committee on Medical Legislation, with power to act:

THE NEED OF NATIONAL LEPROSORIA.

At the January meeting of the Sioux Valley Medical Society, in Cherokee, Dr. A. L. Belt, of Gilmore City, Iowa, read a paper on "The Need of National Leprosoria," in which the following points were emphasized:

1. Leprosy is a contagious disease.
2. Leprosy is on the increase in the United States.
3. Under the lenient enforcement of lax immigration laws, immigration of lepers from countries where leprosy is epidemic is of frequent occurrence.
4. With the recently acquired territory outside of continental America, we have come into possession of a large number of lepers.

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5. Very few of the states have laws making any provision for lepers. Iowa makes absolutely no provisions for lepers, and our State Board is powerless in the matter.

6. The provision made by some states, vis.: that of segregation of lepers within their borders, while it is better than no provision, it is not the best, as the sanitation is not always faultless, and the segregation creates a focus of the disease from which contiguous inhabitants are not always safe.

7. That we now provide for the insane, the consumptive, the inebriate, the blind, the deaf and dumb, the feeble minded and other unfortunates well arranged and comfortable sanatoria. Why not for the leper?

8. The United States government should provide suitable sanatoria for the care and treatment of lepers from the several states in the union. Such sanatoria to be situated on islands where practical and under strict medical supervision, and provided for as congress may direct, especially for the care of lepers who cannot be properly cared for in their own homes.

After the reading of the paper, by a vote of the Society, a committee was appointed to bring the matter before the attention of the medical profession of the state of Iowa, and enlist their aid and support in reaching congress through the Iowa delegation, and urge that something be done for these unfortunates who by reason of their misfortune have become outcasts among us.

The committee earnestly pray you to use your influence in bringing about the needed legislation.

(Signed.) DR. A. L. BELT, Gilmore City, Ia.
DR. C. H. CHURCHILL, Ft. Dodge, Ia.
DR. J. M. BARSTOW, Council Bluffs, Ia.
Committee.

The next order was the reports of special committees.

REPORT OF COMMITTEE ON PUBLICATION.

The Secretary announced the report of the Committe on Publication as follows: That bids had been received for printing the 1903 Transactions from a number of firms. That the bids of the New Nonpareil Company while not the lowest was, all things considered, the best one. It was as follows:

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COUNCIL BLUFFS, IOWA, March 27, 1903.

Mr. J W. Cokenower, Secretary Iowa State Medical Society, Des Moines, Iowa:

DEAR SIR: We beg to submit prices as follows on "Transactions of the Iowa State Medical Society" for the year 1903 as per your specifications: Printed on 70-pound, 25x38, No. 1 S. and S C., type matter and binding same as book of 1902:

Seven hundred copies, 472 pages.....$625.00
Additional copies, each..... .41
Sixteen pages additional, 700 copies..... 18.50

The above price includes wrapping for express and printed wrappers for same

Reprints.	100 Copies.	200 Copies.
Eight pages and cover.....	$3.50	$4.50
Twelve pages and cover.....	4.70	6.00
Sixteen pages and cover.....	5.50	6.60
Twenty pages and cover.....	6.60	7.25

It was moved and seconded that the report be adopted. Carried.

The President called for the report of the Trustees and Finance Committee.

Dr. George R. Skinner reported on behalf of the Finance Committee that the committee had examined the papers and vouchers of the Secretary and Treasurer, and had found them correct in every respect.

On motion, the report was adopted.

Secretary Treynor presented his annual financial report, as follows:

REPORT OF SECRETARY.

Order No.	1902.	
299	May 23—George Van Pelt, reporting meeting and transcribing same	$ 100.00
301	May 23—Clifton Scott, banner for Society.....	10.00
303	Oct. 4—New Nonpareil Co., publishing Transactions	603.63

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304	Oct. 14—J. W. Cokenower, editing Transactions and postage		54.80
Order No.	1903.		
305	Jan. 2—New Nonpareil Co., express, wrappers, letterheads, etc.		20.25
306	April 17—J. W. Cokenower, printing and postage for Committee on Publication		4.00
307	April 17—W. B. Small, Treasurer, salary and expense		144.02
308	April 17—V. L. Treynor, Secretary, salary	$150.00	
	Amount paid New Nonpareil Co. for printing preliminary announcements and programs and postage on same.	66.78	
	To postage on A. M. A. pamphlets	8.36	
	To stenographer in transcribing papers for Transactions, preparing copy for programs, etc., for two years	32.50	
	Year's stamps and desk supplies	63.40	
	To express and freight	18.42	
			339.46
309	April 17—J. N. Warren, chairman committee on hall rent		50.00

The Treasurer, Dr. Small, asked for further time before making his report, stating as his reasons that the dues were not all paid by the members in attendance at this meeting, which was granted.

Dr. Van Buren Knott, of Sioux City, then read the report of the Committee on Constitution and By-Laws.

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REPORT OF COMMITTEE ON CONSTITUTION AND BY-LAWS.

CONSTITUTION.

ARTICLE I.

Name of the Society.

The name and title of this organization shall be the Iowa State Medical Society.

ARTICLE II.

Purposes of the Society.

The purpose of this Society shall be to federate and bring into one compact organization the entire medical profession of the state of Iowa. and to unite with similar associations in other states, to form the American Medical Association; with a view to the extension of medical knowledge, and to the advancement of medical science; to the elevation of the standard of medical education, and to the enactment and enforcement of just medical laws; to the promotion of friendly intercourse among physicians, and to the guarding and fostering of their material interests; and to the enlightenment and direction of public opinion in regard to the great problems of state medicine; so that the profession shall become more capable and honorable within itself, and more useful to the public in the prevention and cure of disease, and in prolonging and adding comfort to life.

ARTICLE III.

Component Societies.

Component societies shall consist of those county medical societies which hold charters from this Society.

ARTICLE IV.

Composition of the Society.

Section 1. This Society shall consist of Members, Delegates and Guests, and Life Members.

Sec. 2. Members.—The Members of this Society shall be the members of the component county medical societies.

Sec. 3. Delegates.—Delegates shall be those members who are elected in accordance with this Constitution and By-Laws

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to represent their respective component county societies in the House of Delegates of this Society.

Sec. 4. Guests.—Any distinguished physician not a resident of this state may become a Guest during any annual session upon invitation of the Society or its Council, and shall be accorded the privilege of participating in all of the scientific work for that session.

Sec. 5. Life Members.—Life Members shall consist of such members in good standing as shall have paid their full annual dues, and all other obligations to the Society for thirty successive years, and of such other worthy members as the Society may designate by unanimous vote. They shall receive the Transactions of the Society, and enjoy all the privileges of members, but shall be excepted from payment of the annual dues.

ARTICLE V.

House of Delegates.

The House of Delegates shall be the legislative and business body of the Society, and shall consist of (1) Delegates elected by the component county societies, and (2) ex-officio, the officers of the Society as defined in this Constitution.

ARTICLE VI.

Sections and District Societies.

The House of Delegates may provide for a division of the scientific work of the Society into appropriate sections, and for the organization of such Councilor District societies as will promote the best interests of the profession, such societies to be composed exclusively of members of component county societies.

ARTICLE VII.

Sessions and Meetings.

Section 1. The Society shall hold an annual session, during which there shall be held daily not less than two general meetings, which shall be open to all registered members, delegates and guests.

Sec. 2. The time and place for holding each annual session shall be fixed by the House of Delegates.

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ARTICLE VIII.

Officers.

Section 1. The officers of this Society shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and ten Councilors.

Sec. 2. The President and Vice-Presidents shall be elected for a term of one year. The Secretary, Treasurer and Councilors shall be elected for terms of five years each, the Councilors being divided into classes so that two shall be elected each year. All of these officers shall serve until their successors are elected and installed.

Sec. 3. The officers of this Society shall be elected by the House of Delegates on the morning of the last day of the annual session, but no Delegate shall be eligible to any office named in the preceding section, except that of Councilor, and no person shall be elected to any such office who is not in attendance upon that annual session and who has not been a member of the Society for the past two years.

ARTICLE IX.

Funds and Expenses.

Funds for meeting the expenses of the Society shall be arranged for by the House of Delegates by an equal per capita assessment upon each county society, to be fixed by the House of Delegates, by voluntary contribution and from the profits of its publications. Funds may be appropriated by the House of Delegates to defray the expenses of the annual sessions, for publication, and for such other purposes as will promote the welfare of the Society and profession.

ARTICLE X.

Referendum.

The general meeting of the Society may, by a two-thirds vote, order a general referendum upon any question pending before the House of Delegates, and the House of Delegates may, by a similar vote of its own members, or after a like vote of the general meeting, submit any such question to the membership of the Society for a final vote; and if the persons voting shall comprise a majority of all the members, a majority of such vote

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shall determine the question, and be binding upon the House of Delegates.

ARTICLE XI.

The Seal.

The Society shall have a common seal, with power to break, change or renew the same at pleasure.

ARTICLE XII.

Amendments.

The House of Delegates may amend any article of this Constitution by a two-thirds vote of the delegates registered at that annual session, provided that such amendment shall have been presented in open meeting at the previous annual session, and that it shall have been sent officially to each component county society at least two months before the session at which final action is to be taken.

BY-LAWS.

CHAPTER I.

Membership.

Section 1. All members of the component county societies shall be privileged to attend all meetings and take part in all of the proceedings of the annual sessions, and shall be eligible to any office within the gift of the Society.

Sec. 2. The name of a physician upon the properly certified roster of members, or list of delegates, of a chartered county society which has paid its annual assessment, shall be prima facie evidence of his right to register at the annual session in the respective bodies of this Society.

Sec. 3. No person who is under sentence of suspension or expulsion from any component society of this Society, or whose name has been dropped from its roll of members, shall be entitled to any of the rights or benefits of this Society, nor shall be permitted to take any part in any of its proceedings until such time as he has been relieved of such disability.

Sec. 4. Each member in attendance at the annual session shall enter his name on the registration book, indicating the component society of which he is a member. No member or

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delegate shall take part in any of the proceedings of an annual session until he has complied with the provisions of this section.

CHAPTER II.

Annual and Special Sessions of the Society.

Section 1. The Society shall hold an annual session at such time and place as has been fixed at the preceding annual session by the House of Delegates.

Sec. 2. Special sessions of either the Society or House of Delegates shall be called by the President, at his discretion or upon petition of twenty delegates.

CHAPTER III.

General Meetings.

Section 1. The general meetings shall include all registered members, delegates, and guests, who shall have equal rights to participate in the proceedings and discussions; and, except guests, to vote on pending questions. Each general meeting shall be presided over by the President, or in his absence or disability, or by his request, by one of the Vice-Presidents. Before it, at such time and place as may have been arranged, shall be delivered the annual address of the President and the annual orations, and the entire time of the session so far as may be shall be devoted to papers and discussions relating to scientific medicine.

Sec. 2. The general meeting shall have authority to create committees or commissions for scientific investigations of special interest and importance to the profession and public, and to receive and dispose of reports of the same; but any expense in connection therewith must first be approved of by the House of Delegates.

Sec. 3. Except by special vote, the order of exercises, papers and discussions as set forth in the official program shall be followed from day to day until it has been completed.

Sec. 4. No address or paper before the Society, except those of the President and orators, shall occupy more than twenty minutes in its delivery; and no member shall speak longer than five minutes, nor more than once on any subject.

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CHAPTER IV.

House of Delegates.

Section 1. The House of Delegates shall meet annually at the time and place of the annual session of the Society, and shall so fix its hours of meeting as not to conflict with the first general meeting of the Society, or with the meeting held for the address of the President and the annual orations, and so as to give delegates an opportunity to attend the other scientific proceedings and discussions so far as it is consistent with their duties. But if the business interests of the Society and profession require, it may meet in advance, or remain in session after the final adjournment of the general meeting.

Sec. 2. Each component county society shall be entitled to send to the House of Delegates each year one delegate for every fifty members, and one for each major fraction thereof, but each county society holding a charter from this Society, which has made its annual report and paid its assessment as provided in this Constitution and By-Laws, shall be entitled to one delegate.

Sec. 3. A majority of the registered delegates shall constitute a quorum, and all of the meetings of the House of Delegates shall be open to members of the Society.

Sec. 4. It shall through its officers, advisory and councilors, consider and advise as to the material interests of the profession, and of the public in those important matters wherein it is dependent upon the profession, and shall use its influence to secure and enforce all proper medical and public health legislation, and to diffuse popular information in relation thereto.

Sec. 5. It shall make careful inquiry into the condition of the profession of each county in the state, and shall have authority to adopt such methods as may be deemed most efficient for building up and increasing the interest in such county societies as already exist, and for organizing the profession in counties where societies do not exist. It shall especially and systematically endeavor to promote friendly intercourse between physicians of the same locality, and shall continue these efforts until every physician in every county of the state who can be made reputable has been brought under medical society influence.

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Sec. 6. It shall elect representatives to the House of Delegates of the American Medical Association in accordance with the Constitution and By-Laws of that body in such a manner that not more than one-half of the delegates shall be elected in any one year.

Sec. 7. It shall, upon application, provide and issue charters to county societies organized to conform to the spirit of this Constitution and By-Laws.

Sec. 8. In sparsely settled sections it shall have authority to organize the physicians of two or more counties into societies, to be designated by hyphenating the names of two or more counties so as to distinguish them from district and other classes of societies, and these societies, when organized and chartered, shall be entitled to all the privileges and representations provided therein for county societies, until such counties may be organized separately.

Sec. 9. It shall have authority to appoint committees for special purposes from among members of the Society who are not members of the House of Delegates, and such committees may report to the House of Delegates in person, and may participate in the debate thereon.

Sec. 10. It shall approve all memorials and resolutions issued in the name of the Society before the same shall become effective.

Sec. 11. It shall present a summary of its proceedings to the last general meeting of each annual session, and shall publish the same in the Transactions.

CHAPTER V.

Elections.

Section 1. All elections shall be by secret ballot, and a majority of the votes cast shall be necessary to elect.

Sec. 2. The House of Delegates on the first day of the annual session shall select a Committee on Nominations consisting of eleven delegates, one from each congressional district. It shall be the duty of this committee to consult with the members of the Society and to hold one or more meetings at which the best interests of the Society and of the profession of the state for the ensuing year shall be carefully considered. The commit-

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tee shall report the result of its deliberations to the House of Delegates in the shape of a ticket containing the names of three members for the office of President and of one member for each of the other offices to be filled at that annual session. No two candidates for President shall be named from the same county.

Sec. 3. The report of the Nominating Committee and the election of officers shall be the first order of business of the House of Delegates after the reading of the minutes on the morning of the last day of the general session.

Sec. 4. Nothing in this article shall be construed to prevent additional nominations being made by members of the House of Delegates.

CHAPTER VI.

Duties of Officers.

Section 1. The President shall preside at all meetings of the Society and of the House of Delegates; shall appoint all committees not otherwise provided for; shall deliver an annual address at such time as may be arranged; shall give a deciding vote in case of a tie, and shall perform such other duties as custom and parliamentary usage may require. He shall be the real head of the profession of the state during his term of office, and, as far as practicable, shall visit by appointment the various sections of the state and assist the Councilors in building up the county societies, and in making their work more practical and useful.

Sec. 2. Vice-Presidents.—The Vice-Presidents, when called upon, shall assist the President in the performance of his duties, and during his absence, or at the request of the President, one of them shall officiate in his place. In the case of death, resignation or removal of the President, the vacancy shall be filled by the Senior Vice-President, beginning with the first. They shall perform all other duties prescribed for that office.

Sec. 3. The Treasurer shall give bond for the trust reposed in him whenever the House of Delegates shall deem it requisite. He shall demand and receive all funds due the Society, together with the bequests and donations. He shall pay money out of the treasury only on a written order of the President, countersigned by the Secretary; he shall subject his accounts to such examination as the House of Delegates may order, and he shall annually

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render an account of his doings and of the state of the funds in his hands. He shall charge upon his books the assessments against each component county society at the end of the fiscal year; he shall collect and make proper credits for the same, and perform such other duties as may be assigned to him.

Sec. 4. The Secretary, acting with the Committee on Scientific Work, shall prepare and issue the programs for and attend all meetings of the Society and of the House of Delegates, and he shall keep minutes of their respective proceedings in separate record books and papers belonging to the Society, except such as properly belong to the Treasurer, and shall keep account of and promptly turn over to the Treasurer all funds of the Society which come into his hands. He shall provide for the registration of the members and delegates at the annual sessions. He shall keep a card-index register of all the legal practitioners of the state by counties, noting on each his status in relation to his county society, and upon request shall transmit a copy of this list to the American Medical Association for publication. In so far as it is in his power he shall use the printed matter, correspondence and influence of his office to aid the Councilors in the organization and improvement of the county societies, and in the extension of the power and usefulness of this Society. He shall conduct the official correspondence, notifying members of meetings, officers of their election, and committtees of their appointment and duties. He shall act as chairman of the Committees on Scientific Work and on Publication. He shall employ such assistance as may be ordered by the Council or the House of Delegates. He shall annually make a report of his doings to the House of Delegates. In order that the Secretary may be enabled to give that amount of time to his duties which will permit of his becoming proficient, it is desirable that he should receive some compensation. The amount of his salary shall be fixed by the House of Delegates.

CHAPTER VII.

Council.

Section 1. The Council shall hold daily meetings during the annual session of the Society and at such other times as necessity may require, subject to the call of the Chairman or on peti-

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tion of three Councilors. It shall meet on the last day of the annual session of the Society for re-organization and for the outlining of work for the ensuing year. At this meeting it shall elect a Chairman and Secretary, and it shall keep a permanent record of its proceedings. It shall, through its Chairman, make an annual report to the House of Delegates at such time as may be provided.

Sec. 2. Each Councilor shall be organizer, peacemaker and censor for his district. He shall visit each county in his district at least once a year for the purpose of organizing component societies where none exist, for inquiring into the condition of the profession, and for improving and increasing the zeal of the county societies and their members. He shall make an annual report of his doings, and of the condition of the profession of each county in his district to each annual session of the House of Delegates. The necessary traveling expenses incurred by such Councilor in the line of the duties herein imposed may be allowed by the House of Delegates upon a proper itemized statement, but this shall not be construed to include his expense in attending the annual session of the Society.

Sec. 3. Collectively the Council shall be the Board of Censors of the Society. It shall consider all questions involving the rights and standing of the members, whether in relation to other members, to the component societies, or to this Society. All questions of an ethical nature brought before the House of Delegates or the general meeting shall be referred to the Council without discussion. It shall hear and decide all questions of discipline affecting the conduct of members or of a county society, upon which an appeal is taken from the decision of an individual Councilor. Its decision in all such cases shall be final.

Sec. 4. The Council shall have the right to communicate the views of the profession and of the Society in regard to health, sanitation and other important matters to the public and the lay press. Such communications shall be officially signed by the chairman and secretary of the Council, as such.

CHAPTER VIII.

Committees.

Section 1. The standing committees shall be as follows:

A Committee on Scientific Work.

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A Committee on Legislation.

A Committee on Publication.

A Committee on Nominations.

A Committee on Necrology.

A Committee on Arrangement, and such other committees as may be necessary. Such committees shall be elected by the House of Delegates, unless otherwise provided.

Sec. 2. The Committee on Scientific Work shall consist of three members, of which the Secretary shall be a member and chairman, and shall determine the character and scope of the scientific proceedings of the Society for each session, subject to the instructions of the House of Delegates or of the Society, or to the provisions of the Constitution and By-Laws. Thirty days previous to each annual session it shall prepare and issue a program announcing the order in which papers, discussions and other business shall be presented, which shall be adhered to by the Society as nearly as practicable.

Sec. 3. The Committee on Public Policy and Legislation shall consist of three members and the President and Secretary. Under the direction of the House of Delegates it shall represent the Society in securing and enforcing legislation in the interest of the public health and of scientific medicine. It shall keep in touch with professional and public opinion, shall endeavor to shape legislation so as to secure the best results for the whole people, and shall utilize every organized influence of the profession to promote the general influence on local, state and national affairs and elections. Its work shall be done with the dignity becoming a great profession and with that wisdom which will make effective its power and influence. It shall have authority to be heard before the entire Society upon questions of great concern at such time as may be arranged during the annual session.

Sec. 4. The Committee on Publication shall consist of three members, of which the Secretary shall be one and chairman, and shall have referred to it all reports on scientific subjects, and all scientific papers and discussions heard before the Society. It shall be empowered to curtail or abstract papers and discussions, and any paper referred to it which may not be suitable for

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publication in the Transactions may be returned to the author. The committee shall have authority to arrange for the publication and distribution of the Transactions after receiving competitive bids, and shall use diligence in getting them into the hands of the members. All papers read before the Society shall be the property of the Society.

Sec. 5. The Committee on Necrology, consisting of five members, who shall prepare for each session suitable biographical notices of deceased members.

Sec. 6. The Committee on Nominations shall be appointed and perform its duties in accordance with the provisions of Chapter V, Section 2, of these By-Laws.

Sec. 7. The Committee on Arrangements shall consist of the component society in the territory in which the annual session is to be held. It shall, by committees of its own selection, provide suitable accommodations for the meeting places of the Society and of the House of Delegates, and of their respective committees, and shall have general charge of all the arrangements. Its chairman shall report an outline of the arrangements to the Secretary for publication in the program, and shall make additional announcements during the session as occasion may require.

CHAPTER IX.

Assessments and Expenditures.

Section 1. An assessment of two dollars per capita on the membership of the component societies is hereby made the annual dues of this Society. The Secretary of each county society shall forward its assessment, together with its roster of all officers and members, list of delegates, and list of non-affiliated physicians of the county to the Secretary of this Society thirty days in advance of each annual session.

Sec. 2. Any county society which fails to pay its assessment, or make the reports required, on or before the date above stated, shall be held as suspended, and none of its members or delegates shall be permitted to participate in any of the business or proceedings of the Society or of the House of Delegates until such requirements have been met.

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Sec. 3. All motions or resolutions appropriating money shall specify a definite amount, or so much thereof as may be necessary for the purpose indicated, and must be approved by the Council and House of Delegates on a call of the ayes and noes.

CHAPTER X.

Rules of Conduct.

The principles set forth in the Code of Ethics of the American Medical Association shall govern the conduct of members in their relations to each other and to the public.

CHAPTER XI.

Rules of Order.

The deliberations of this Society shall be governed by parliamentary usage as contained in Roberts' Rules of Order, unless otherwise determined by a vote of its respective bodies.

CHAPTER XII.

County Societies.

Section 1. All county societies now in affiliation with the State Society, or those that may hereafter be organized in this state, which have adopted principles of organization not in conflict with this Constitution and By-Laws, shall, upon application to the House of Delegates, receive a charter from and become a component part of this Society.

Sec. 2. As rapidly as can be done after the adoption of this Constitution and By-Laws, a medical society shall be organized in every county in the state in which no component society exists, and charters shall be issued thereto.

Sec. 3. Charters shall be issued only upon approval of the House of Delegates, and shall be signed by the President and Secretary of this Society. The House of Delegates shall have authority to revoke the charter of any component county society whose actions are in conflict with the letter or spirit of this Constitution and By-Laws.

Sec. 4. Only one component medical society shall be chartered in any county. Where more than one county society exists, friendly overtures and concessions shall be made, with the

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aid of the Councilor for the district if necessary, and all of the members brought into one organization. In case of failure to unite, an appeal may be made to the Council, which shall decide what action shall be taken.

Sec. 5. Each county society shall judge of the qualification of its own members, but, as such societies are the only portals to this Society and to the American Medical Association, every reputable and legally registered physician who is practicing, or who will agree to practice, non-sectarian medicine shall be entitled to membership. Before a charter is issued to any county society, full and ample notice and opportunity shall be given to every such physician in the county to become a member.

Sec. 6. Any physician who may feel aggrieved by the action of the society of his county in refusing him membership, or in suspending or expelling him, shall have the right of appeal to the Council and to the House of Delegates.

Sec. 7. In hearing appeals the Council may admit oral or written evidence as in its judgment will best and most fairly present the facts, but in case of every appeal, both as a board and as individual Councilors in district and county work, efforts at conciliation and compromise shall precede all such hearings.

Sec. 8. When a member in good standing in a component society moves to another county in this state, his name, upon request, shall be transferred without cost to the roster of the county society into whose jurisdiction he moves.

Sec. 9. A physician living on or near a county line may hold his membership in that county most convenient for him to attend, on permission of the society in whose jurisdiction he resides.

Sec. 10. Each county society shall have general direction of the affairs of the profession in the county, and its influence shall be constantly exerted for bettering the scientific, moral and material condition of every physician in the county; and systematic efforts shall be made by each member, and by the society as a whole, to increase the membership until it embraces every qualified physician in the county.

Sec. 11. At (some meeting in advance of the annual session of this Society) each county society shall elect a delegate

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or delegates to represent it in the House of Delegates of this Society, in the proportion to one delegate to each fifty members or fraction thereof, and the Secretary of the Society shall send a list of such delegates to the Secretary of this Society, at least ten days before the annual sessions.

Sec. 12. The Secretary of each county society shall keep a roster of its members, and a list of the non-affiliated registered physicians of the county, in which shall be shown the full name, address, college and date of graduation, date of license to practice in this state, and such other information as may be deemed necessary. He shall furnish an official report containing such information, upon blanks supplied him for the purpose, to the Secretary of this Society, thirty days in advance of each annual session, and at the same time that the dues accruing from the annual assessment are sent in. In keeping such roster the secretary shall note any changes in the personnel of the profession by death, or by removal to or from the county, and in making his annual report he shall be certain to account for every physician who has lived in the county during the year.

CHAPTER XIII.

Amendments.

These By-Laws may be amended at any annual session by a majority vote of all the delegates present at that session, after the amendment has laid upon the table for one day.

At the conclusion of the reading of the report, Dr. A. L. Wright, of Carroll, moved that the report be received and adopted as read.

Seconded by Dr. G. G. Cottam.

DR. A. B. DEERING, of Boone.—This is not the Constitution and By-Laws presented to us last year. It was ruled then that the Constitution and By-Laws must lie over for one year. Now, Mr. President, I am opposed to adopting the Constitution and By-Laws as read hurriedly this morning, and I believe this matter should lie over one year.

THE PRESIDENT.—The chair decides not. This is the report of the committee appointed for the purpose of drafting a new Constitution and By-Laws, and their report has been presented.

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DR. GEORGE R. SKINNER, of Cedar Rapids.—What is the status of membership? If this Constitution and By-Laws is adopted, will we commit the Society? There are many gentlemen who have been members of the Iowa State Medical Society for a great many years, and if I understand the matter correctly, if we adopt this Constitution and By-Laws as read, there is no longer any Iowa State Medical Society. Is not that the understanding?

DR. VAN BUREN KNOTT.—I do not think so.

DR. SKINNER.—I do not believe that we should legislate ourselves out of existence, and I feel reasonably sure that if we accept the wording of the report, we do not exist as a society after the adoption of this Constitution and By-Laws.

Another thing I am opposed to, not personally, because I expect to pay my dues, but I am opposed to standing sponsor for another fellow. I do not think I would like to belong to a county medical society, if the members of that county society is likely to be subjected to suspension or expulsion from the State Society because one of its members failed to pay his dues. There is more in that than you think. Those of you who have had experience with county societies know how difficult it is sometimes to collect small fees from the members. Some of you know of the difficulty we had in collecting money for the Rush monument fund. They will pay a good deal of money for some other purposes more readily than they will pay small dues. Let us take a county medical society, say with seventy-five members, who are scattered around, as a good many of them are, in the four corners and small hamlets, and who will agree to say that that county society will send say $150.00 to the State Society, or every member thereof shall stand suspended. I cannot agree to that.

I wish to appeal from the decision of the chair in reference to not letting this Constitution and By-Laws lie over for one year.

The appeal from the decision of the chair was put and the chair was sustained in his ruling.

THE PRESIDENT.—For the information of Dr. Skinner and Dr. Deering, I will say that the Constitution and By-Laws as read is what is known as the model Constitution and By-Laws

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adopted by the American Medical Association, and which has been adopted by several states, in which its harmonious working has been displayed.

DR. D. C. BROCKMAN, of Ottumwa.—There are some details in this Constitution and By-Laws that may not work out right. If so, they can be modified. Changes or modifications can be made later. Sometimes we think we see a substance, but when we get close to it it is a shadow. This Constitution and By-Laws has been before the profession for two or three years. We have been discussing it. It has been tried in several states, and is working beautifully. I am very much in favor of it being adopted at once, as we will then have a Constitution to work with. The old Iowa State Medical Society is going to live right straight through; it will live the life of time.

DR. W. A. ROHLF, of Waverly.—I want to endorse what Dr. Brockman has said. Several states have adopted this new Constitution and By-Laws, and it has had the effect of increasing the membership from one hundred to eight hundred per cent. I am in favor of its adoption.

DR. IRA K. GARDNER. of New Hampton.—There may be some things in this Constitution and By-Laws, as read, that we do not like. The bugaboo Dr. Skinner speaks of has no relevancy here. It can be easily changed. There were some things about the old Constitution that many of us did not like. There were one or two things that were not clearly or exactly understood. We can easily correct or amend the Constitution and By-Laws after adoption. I am in favor of making progress, and the Massachusetts of the West should not be behind the Massachusetts of the East. (Applause).

DR. E. S. BOWMAN, of Davenport.—I do not understand the position taken by Dr. Skinner exactly. I will tell you the manner in which we have handled this matter in Davenport. In the Scott County Medical Society we have already adopted this Constitution and By-Laws, and we have provided for an annual due of $5.00, which shall be paid to the county society. That constitutes a member in good standing in the county society. The society transmits two dollars for each member of the county society who pays that $5.00 due to this Society. I do not under-

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stand that it injures the membership of anyone in the county society who pays his dues. As I understand, the law is that the Secretary shall transmit to the State Society a list of members in good standing, with the necessary $2.00, per capita, and that settles the matter. Those who do not pay their dues forfeit their membership, because they have failed to keep in good standing with the county society. From my observation of county and district societies, I feel that any man who will not spend an annual due of $5.00, in order to keep in good standing in his county and State societies, is not worth worrying about.

As there was no further discussion, the President put the motion to adopt the Constitution and By-Laws as read, and it was carried unanimously, its adoption being followed by great applause.

The President appointed Drs. James and Hibbs to escort the newly elected President to the chair.

Dr. Priestley, the retiring President, in introducing his successor, said:

Ladies and Gentlemen: I take great pleasure in introducing to you your President-elect, Dr. Scroggs, of Keokuk. He really does not need an introduction to any of you. You all know him, and he knows you. I ask for him the same courtesy and kind treatment you have extended to me. (Applause).

Dr. Scroggs, in accepting the Presidency, said:

Mr. President and Fellow Members of the Iowa State Medical Society: Were I to attempt to express my appreciation of this compliment conferred upon me, language would fail me. Therefore, I can only say from the bottom of my heart, I thank you. I realize fully that there are responsibilities devolving upon me in assuming this office at this particular time. The efficient manner in which my distinguished predecessor has conducted the affairs of this Society makes it particularly responsible. And, then, again, in organizing under this new Constitution, I feel that I will have to ask your forbearance, for I fear errors will be committed. Regarding the questions which were raised a moment ago, I hope to have your suggestions in the matter, and I

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trust that any errors that may be made will be attributed to the head and not to the heart.

Again thanking you, I await your further pleasure. (Applause).

Dr. E. L. Stevens, of Des Moines, offered the following resolution:

WHEREAS, Other State medical societies have reorganized in accordance with the plans of the Committee on Reorganization of the American Medical Association, and, without exception, report great gains in membership and interest in the State Society; and

WHEREAS, A few counties in Iowa have reorganized in accordance with plans of the same committee; therefore, be it

Resolved, By the Iowa State Medical Society, that (1) a Councilor be elected by this Society for each Congressional district, whose duties shall be to assist in organizing or reorganizing the county societies in their respective districts. (2) That Dr. E. E. Dorr, of Des Moines, be made Chairman of the Councilors. (3) That the traveling and postage expenses of such Councilors be paid by the Iowa State Medical Society.

I would like to say, in anticipation of the event just occurred, that the Nominating Committee took upon itself to suggest names for Councilors, although the committee was not authorized to do so at the time, and when the time comes to elect them, we would suggest as a part of the resolution the following names: First district, C. E. Ruth, Keokuk; Second district, W. L. Bierring, Iowa City; Third district, D. W. Crouse, Waterloo; Fourth district, D. Eggloff, Mason City; Fifth district, G. E. Crawford, Cedar Rapids; Sixth district, D. C. Brockman, Ottumwa; Seventh district, E. E. Dorr, Des Moines; Eighth district, F. E. Sampson, Creston; Ninth district, J. M. Emmert, Atlantic; Tenth district, C. H. Churchill, Fort Dodge; Eleventh district, E. Hornibrook, Cherokee.

By the adoption of this resolution, the Councilors can go ahead with the reorganization of the various county societies, so that on the first day of the State meeting, the House of Dele-

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gates can be organized and be in good working order. I move the adoption of this resolution.

Seconded and carried.

DR. W. B. SMALL, of Waterloo.—I see one trouble that is liable to arise, and we ought to deal with it now, to make the matter clear. It is this: The question will arise as to permanent membership now. Suppose I am a member of the State Society; I go back home, and I find myself at present not a member of the county society, then some one will say that I have got to forfeit my membership in the State Society because I am not a member of the county society. I fear this will cause some trouble. We ought to settle that matter now. I move, Mr. President, that the now present permanent members of the State Society remain members of this Society.

THE PRESIDENT.—That involves changing the By-Laws. You must write out your motion and let it lie over.

DR. E. E. DORR.—*Mr. President:* I have an amendment to offer for consideration next year. There has been some discontent manifested as to the present method of publication of the proceedings, because they are delayed, so that the actual active work of the Society is delayed to such an extent that the effectiveness of these meetings is not distributed to our members as promptly as might be.

AMENDMENT TO THE CONSTITUTION.

That Article II of the Constitution be amended by adding "to acquire and hold property; to publish or contract for the publishing of the proceedings." (To lie over one year).

DR. GEORGE R. SKINNER.—I have a bill which has been presented by the Y. M. C. A. for $50.00, on account of rental of this hall, and I move that the Secretary be authorized to draw an order for it, also that the Secretary be authorized to draw an order for paying the stenographer for reporting and transcribing the minutes and discussions of this meeting.

Seconded and carried.

DR. E. L. STEVENS. of Des Moines.—I wish to move, Mr. President, that votes of thanks be extended to the Medical Society of Sioux City for entertaining us so royally; also to the

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citizens of this city; the ladies for their kindness in entertaining the visiting ladies; to the railroads for reduced rates, and to the daily press for full reports of the proceedings of our sessions.

Seconded and carried.

DR. W. B. SMALL.—I desire to introduce this resolution:

Resolved, That the present permanent members of this Society retain their membership. Seconded.

THE PRESIDENT.—I do not think that resolution is necessary. They are all members until after the next meeting. You cannot rule them out.

DR. SMALL.—If that is the understanding, all right.

THE PRESIDENT.—The ruling of the chair is that all permanent members of the Iowa State Medical Society at the present time are members until the next meeting, and that they terminate their membership by their own acts at that time.

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DR. E. L. STEVENS.—I want to introduce another resolution. It is:

WHEREAS, The pathologic exhibit made at Des Moines at the last meeting of the Iowa State Medical Society was greatly appreciated by the members present, and was of great value in stimulating and promoting interest in the scientific work of the Society; therefore, be it

Resolved, That the Treasurer be authorized to issue warrants not to exceed $50.00. to defray the necessary expenses of collecting such exhibits in Des Moines at the meeting in 1904.

Seconded by Dr. Eschbach.

It was moved and seconded that this resolution be referred to the Trustees, with power to act. Carried.

The Treasurer, Dr. Small, then presented his annual report, which is as follows:

REPORT OF TREASURER.

1902.

May 23—Balance on hand.....	$1,235.07	
May 23—Membership fees during year, to April 13, 1903.....	737.00	
May 29—Order No. 301.....		$ 10.00

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Nov. 1—Order No. 303		603.63
Nov. 1—Order No. 304		54.80
1903.		
Jan. 12—Order No. 305		20.25
Jan. 12—Exchange		1.20
April 17—Order No. 306		4.00
April 17—Order No. 307		144.02
April 17—Order No. 308		339.46
April 17—Order No. 309		50.00
April 17—By fifty-two new members	156.00	
April 17—Membership fees during this meeting	252.00	
April 17—Balance		1,152.71
	$2,380.07	$2,380.07

On motion, the report of the Treasurer was adopted.

There being no further business to come before the meeting, the Society, on motion, then adjourned, to meet in Des Moines, in 1904.

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PRESIDENT'S ADDRESS.

Fellows of the Iowa State Medical Society:

I thank you again for the great honor you have conferred upon me, by electing me your President. Twenty-five years ago I was elected a member of this Society. Its membership at that time was 242, which was derived from about eleven county and district medical societies, with a membership of 300. These societies secured their membership from the 1,500 physicians then practicing in the state. Iowa had at that time a population of 1,487,584, and there was one physician to about every 990 people. Sixteen out of each hundred physicians in the state were members of the State Society, and only about seven out of each hundred were members of the National Asociation. We now have a membership in this Society of 834, drawn from sixty-five county and district societies, with a membership of 2,500. The membership of these sixty-five societies is derived from the 4,111 physicians practicing in the state. The population of Iowa now being about two and one-quarter millions, we have one physician to every 542 people. Twenty out of every hundred physicians are members of the State Society; thirteen out of every hundred are members of the National Association.

The increased ratio of members in the State and National Associations is not so great as it should be. If we adopt the proposed plan of reorganization, which shall come up at this meeting, we shall see a wonderful growth in the membership of our State Society, and the National Association. I suggest that a proposition which will be presented to the American Medical Association, at the coming meeting, by which all members of county societies shall, for a single fee paid to the Treasurer of the respective county society, become members at the same time of the State and National Associations, be heartily supported by our representatives in the House of Delegates.

I also suggest the idea of extending membership to every reputable physician who is licensed by the State Board of Ex-

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aminers to practice medicine, provided he is willing to practice scientific medicine, and will not advertise sectarian medicine. Wherever this plan has been adopted, a united profession has been secured the harmonious working of which may be seen in Alabama, Michigan and Illinois.

Each county society should be the judge of its own membership.

The publication of the Transactions of the Society in book form has proven very unsatisfactory. The crying fault, until the last year, was the length of time after the meeting before the Transactions were issued to the members. The transactions published in book form are seldom read. The cost to the Society or the member is a little over one dollar a volume, or over one dollar a year. With the expenditure of the same amount of money we could have the transactions published in a live, wide-awake Iowa monthly medical journal. A portion of the transactions coming each month along with the current medical literature will be read. The cost of issuing a journal of our own is too great to be undertaken for some years to come, or at least until our membership is large enough to warrant us in assuming the burden.

OVERCROWDING OF THE PROFESSION.

Is the profession overcrowded in Iowa? We have in the state, statistically, one physician to every 542 inhabitants. Many physicians are licensed to practice who never practice; many are never fit to practice, no matter how thorough may have been their training. From various causes they fall by the wayside and drop out of the profession. We have actually one physician to about every 720 inhabitants.

We all know that a physician with too large a practice cannot do as good work as he could with only a comfortable practice.

From the financial standpoint it may be interesting for you to know that I have made a careful and conservative estimate of the incomes of all the physicians in ten cities in Iowa with a population of from twenty to forty thousand; ten cities of from ten to twenty thousand; ten towns of from six to ten thousand; ten towns of from two to six thousand, and ten villages of less

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than three hundred. This investigation was made for me by one of the largest mercantile agencies in the United States, and can be depended upon as a very conservative estimate. The average income is $2,500.00 a year. In only one instance was an income of less than $1,000.00 recorded. Towns of from eight to ten thousand inhabitants made the poorest showing. The incomes of the physicians in the villages of less than three hundred were fully up to the average, and much better than their fraters in the eight and ten thousand towns. We are quite fortunate in Iowa in having no large cities.

Looking at this subject from a scientific and financial aspect, we can safely say that the profession in Iowa is not overcrowded.

LEGISLATION.

Twenty-five years ago there were no laws governing the practice of medicine in the state of Iowa. The first law was passed April 8, 1886, when a State Board of Health and a Board of Examiners were established, and certificates were granted graduates from reputable colleges; to those not so qualified, but who had practiced in the state for five consecutive years; to those not having either of these qualifications, but who passed a satisfactory examination before the Board of Examiners.

In 1888 this law was amended by a reciprocity clause which granted a certificate to physicians from other states holding certificates from their State Board, without re-examination. Illinois and Missouri, however, refused to reciprocate, and in 1890 this clause was repealed. On January 1, 1899, our present efficient law went into effect.

A close personal relation with the law-makers of the state of Iowa for the past twenty-five years, makes me feel myself qualified to offer the following suggestions:

Do not ask for too much legislation. When you desire a law passed, go at it in a business-like way, and have sufficient funds to meet all requirements. I do not know a single law-maker among the many hundreds with whom I am acquainted, who could be induced to vote for a law by the tender of a money bribe; but I do know that it takes money to get the desired acquaintance necessary to legislate a bill through successfully; to grease the wheels of the machinery.

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July, 1902, the law for controlling the inebriate went into effect, a poor, lame, halting law, with enough sins of commission and omission to make it more of a curse than a blessing, its greatest fault being the confining of the inebriate in the insane asylums, a grave injustice to the insane. The law has been in effect long enough to show that the inebriate, as a rule, is a worthless, lazy individual, devoid of any ability, except to lie proficiently. Work he will not. He will sit around, play cards, and monopolize the billiard rooms; he is well fed, and is given one round of ease and pleasure, at the expense of the state. This should be changed. There is no doubt but what the confirmed inebriate needs the aid of his sane brothers, to save him from the mental and physical decay that is certain to overtake him. Prolonged abstinence is the only cure for him. We should give this to him, but we should also give him asylums for his class alone, or devote a portion of our penitentiaries for his use. He should be given work and made to do it. He should be confined for a period of not less than a year, and then liberated, not, as our law has it, at the request of his friends, but only when his term has expired. A law such as they have in Australia or New Zealand would be of much benefit.

The standard of requirements for admission into any of our Iowa medical colleges is high enough. I am sorry to say that this standard is not maintained. I derive this information from an intimate acquaintance with the professional qualifications of practitioners of medicine graduated from all the medical colleges in Iowa. Let us see that the present standard is maintained, before we demand an elevation of it.

Dichotomy, or division of fees, is a growing evil in the profession of Iowa. While not original with the Iowa practitioner, yet its introduction has been accepted with as much avidity as was the introduction of spirits among the North American Indians, and if not checked, the result will be the same. I shall not attempt to discuss the question, which I know is defended with a fallacious logic. The practice of it defrauds the patient, debases the medical man, and demoralizes the profession.

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THE PROGRESS OF MEDICINE IN THE LAST TWENTY-FIVE YEARS.

The progress of medical science in the last quarter of the Nineteenth century is undoubtedly greater than it has been since the days of Galen. Prior to the invention of the microscope, nothing could be done to further its development. Even then those instruments were crude and imperfect. But the labors of Professor Helmholtz and the ingenuity of Zentmayer brought out our advanced knowledge of medical sciences.

BIOLOGY.

Twenty-five years ago very little, if anything, was known of biology.

It was the brains of Pettenkofer, von Buhl and Voit, of Germany; Huxley, Herbert Spencer, Lancaster, Archer, Balfourd and Klein, of England, and the reward of their influence that biology has been brought to its present status.

In 1877, Foll discovered the function of the complicated structure known as the amphiaster.

In 1878, Klein was the first who brought out the origin and structure of cells and nuclei.

In 1882, Bizzozero discovered the blood-plaques. In the same year, Bajarid found the mode of reproduction of the marrow of long bones and of the articular extremities after resections. Tizzoni observed the haematopoietic functions and the total reproduction of the spleen after extirpation. L. Vella devised a new method for providing enteric juice and its examination. Albertotti determined experimentally the size of the inversed ophthalmoscopic image. Colasanti found the change in form of uric acid by the action of glycerine. Sciamanna observed the modifications of the cerebral pulse by the action of electric currents on the dura mater and Guareschi and Masso made highly important discoveries regarding the chemical and physiological nature of ptomaines. Fiori determined the relation between the epileptic paroxysm and albuminaria. C. Golgi observed the origin of the olfactory tract and the structure of the olfactory lobes. Golgi also made cerebral localizations in regard to anatomical observations. Romiti discovered the origin of the

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mesoderm and its relation to the yolk of the egg. Gerlach observed the entodermal origin of the dorsal cord.

In 1883, Perroncito observed the transmission of anthrax from the mother to the foetus. In the same year, Fano found a new automatical center in the bulbo-spinal tract. Nagelli founded the idioplasm theory.

In 1884, Celli and Marchiafava described the alteration of the red blood corpuscles in malaria and made researches on melanaemia. In the same year, Tizzoni observed the alterations of the vagus during the Cheyne-Stokes phenomenon. Desalles found albumen in the saliva and bile of albuminists. Rosenthal made discoveries regarding the specific energy of the nerves, and Klebs in the etiology of Asiatic cholera. Perroncito observed the transmission of anthrax through the digestive tract.

In 1885, Biederman observed the antagonistic polar-actions in electrified muscles.

In 1886, Langendorff observed the chemical reaction of the gray substance of the brain, and Ehrlich the Methylenblue reaction of the living nervous tissue; Gudden localized the functions of the cortex of the brain, and Rosenthal made discoveries regarding the electric conduction of the animal tissue.

In 1887, Mosso observed the transformation of red blood corpuscles into leucocytes and their necrobiosis in suppuration and coagulation. In the same year, Cattaneo and Monti described degenerative alterations of the red blood corpuscles in malaria and Coppola the physiological action of santonin derivatives. Nothnagel made localizations of the diseases of the brain, and Krause observed the ascendent and descendent degeneration of the nerves, while Loewy located the center of respiration and Naunyn the seat of the aphasia.

In 1888, Aducco demonstrated the physiological action of toxic bases in normal urine, and Coppola the physiological action of pilocarpin. In the same year, Golgi found phagocytism in malarious infection. Moscatelli demonstrated the presence of paralactic acid in the thymus and thyroid glands.

In 1889, Mya observed the chemical nature of the soaps of the faeces, and in the same year Nasse the chemistry of the glutin. Haidenhain demonstrated that every mamma containing a cancerous tumor is diseased throughout.

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In 1890, Feletti and Grassi made new discoveries regarding the parasites of malaria. In the same year, Morpurgo observed the relations of cellular regeneration to the vasomotoric paralysis. Mosso located the thermic centers of the brain. Ruffer showed the phagocytic action of the lymphoid cells of the intestine.

In 1891, Gullard observed the development and structure of the tonsils, and in the same year Stiles observed the structure of the axillary glands. Falchi discovered the histologic alterations of the retina in artificial rabies, and Foa the alterations of the spinal cord in influenza. Golgi demonstrated the evolutive cycle of the parasites of malaria in tertiary fevers. Tizzoni and Catanni observed the poison of tetanus, and Schmiedberg observed the chemical composition of the cartilage.

In 1892, Consiglio found fibres in the vagus which retard the respiration. In the same year, Golgi demonstrated the action of quinine on the parasites of malaria; Sansoni observed the glycolitic ferment of the blood in its relations to the origin of diabetes.

In 1893, Baldi observed the physiological action of hydrazine, and Lilienfeld and Monti discovered a new method to localize microchemically phosphorus in the tissues.

In 1894, G. Fano added new facts to the functions of the thyroid. In the same year, A. Ruffini found a new terminal nervous organ in the finger bulbs, and J. Rosenthal devised new means for physiological calorimetry.

In 1895, Buckmaster contributed new facts concerning the origin and nature of several toxines. In the same year, Dubois discovered in Java parts of a skull and a femur claimed to belong to a median form between man and anthropoid apes, and called "Pithecanthropus erectus."

In 1896, Cavazanni and Soldaini proved that the production of glycose in the liver is a true secretion. In the same year, Lombroso made numerous discoveries regarding the anatomy of criminals. W. Reinhard made new discoveries regarding the amniotic cell division.

In 1897, Marenghi observed the relation between the elimination of nitrogen and the production of antidiphtheria serum in the horse. In the same year, Popoff made discoveries regard-

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ing the histogenesis of the cortex of the cerebellum. Friedenthal made new discoveries regarding the function of the leucocytes in the organism.

In 1899, Ehrmann made important observations regarding the melanotic pigment and pigment-forming cells of man and vertebrates.

In 1900, Grassi observed the mode of life of the intermediate host of the plasmodian malariae.

EMBRYOLOGY.

Embryology, in the last twenty-five years, has been the greatest hobby for deep study by the naturalists. Every possible theory that may generate organic life has been turned over and over again, until it brought forth from its darkest seats, a booming bright light to shine upon some new development of embryos.

Unfortunately, embryology is even less an exact science than the other branches of medicine. Therefore, it gives the student, or rather, he takes the privilege of compounding his theory in whatever way he deems proper, and the hypothesis advanced today may be overthrown tomorrow. To name them all and give them dates would make volumes. However, we may mention some that have been recognized and substantiated by the following embryologists within the last quarter of the century: Bergh, Bianchi, Bottanzzi, Breternitz, Cavazanni, Cermenati, Chiveitz. Coutance, Duval, Gilis, His, Manton, Merkel, Michaelis, Muller, Tourneux, Valenti.

In 1878, Cadiat recognized the mass of tissue in the embryo, which is destined to give rise to the diaphragm.

In 1880, Rabl-Rückhard first suggested that the epiphysis represented a visual organ.

Ehlers, in 1881, discovered the existence of a mucous fold bridging the superior and inferior alveololabial sulci at the interval of the incisor and canine teeth, which becomes more distinct by retraction of the lips.

In the same year, His suggested that all sensory nerve fibres arise from the ganglia and grow centrifugally and centripetally, and gave positive proof of his views in 1886; and in 1888 he

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showed that it was true not only of the spinal but also of the cephalic ganglia.

The last hypoglossal ganglion was discovered by Froriep in 1882, in ruminant embryos, and in 1888, His observed its presence in the human embryo.

In 1884, Beraneck showed that there is a definite connection between certain neural segments and cranial nerves, thus giving the first real foundation for establishing their segmental relations.

In 1885, Overlach found the origin of the decidual cells to be in the epithelium.

In 1887, Waldeyer discovered that the intervillous spaces are actually channels of the maternal circulation of the placenta.

Phisalix, in the same year, found that the partition and the formation of the auricles is formed by single bodies.

Renaut found that foetal hyaline cartilage contains neither fibres proper, nor canals for transporting fluids.

Gerlach found in his studies on the five layers of the gray substance of the cerebral vesicle in the human embryo 3 cm. from head to nates: (1) that in younger embryos the differentiation in the stratification of the gray substance is more marked than in the older embryos; (2) distinction of color decreases with advancing development, even after birth. (3) The first rudiment of the cerebral vesicle is morphologically analogous with the gray substance of the convolutions of the cerebrum. (4) The white substance of the primary rudiment is minimum in thickness, but increases in proportion to the gray in thickness, with the development of the embryo.

In 1888, His first fully recognized the four thickenings which run the entire length of the medullary cord, and which he named "zones."

In the same year, His discovered the development of the human lungs.

Ewetzky discovered the development of the meatus nasolacrymalis.

In 1889, E. M. Nelson, in making observations upon the anatomy of human spermatozoa, found that the head, or spore, is oviform, with its smallest diameter nearest the tail.

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In 1890, Disse discovered the development of the nasal cavity in man.

In 1891, Waldeyer advanced the theory of individuality of the nerve elements, or the "Neuron Concept."

In 1893, Schultze discovered the origin and development of the lacteal glands.

In 1896, Heintzmann discovered the structure and development of the platysma myoides in embryonal state.

In 1897, Shenck brought out his theory of sex determination.

In 1898, Sano found the origin of the phrenic nerve, in a long nucleus, located in the center of the anterior horn, and extending from the third cervical to the middle of the sixth segment.

In the same year, Schaffer found the connecting substance between non-striated muscle-fibres of a fibrous and alveolar resticulum surrounding each cell, are continuous with that of other cells, and the fibrous envelope surrounding each muscle bundle.

Glaser, after making extensive investigations upon "fragmented" myocardium, demonstrated the existence of a homogeneous non-nucleated covering of the muscle fibres of the heart.

In 1899, Schaefer has shown that the fibres of the descending antero-lateral tract in the spinal cord, end in the anterior horns of the cord, as arborizations around the ganglion cells.

In the same year, Barbieri ascribed to the sympathetic nerves a spinal and cerebral origin.

In 1900, Monot described a new connection between vertebrate blood vessels, which not being capillaries, he named "sinusoids."

In the same year, Scharfe denied the existence of a valve in the ductus Botalli at its termination into the aorta, and says the same is an artifact.

Beard, in studying the function of the thymus gland, found it to be that of a leucocyte-forming organ.

In 1901, Nobiling found that some centers of ossification in the foetus and new-born, appeared as early as the seventh month.

In the same year, Rachmanow found that vascular and peri-

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vascular Vater-Pacinian bodies are of constant occurrence in and around the aorta of man and other animals.

ANATOMY.

Anatomy is the only exact science in medicine. From the time of Hippocrates until the present date, no change in structure of the human frame has taken place. Nomenclature may have changed from the Greek to the Latin, or into more modern languages, but the anatomist of the middle of the last century had no idea that anatomy could be improved upon, any more than we could improve upon the alphabet of the English language.

But the great Virchow and the immortal Rokitanski opened a new chasm by their pathological investigations that led to the discovery of many anatomical structures within the last twenty-five years.

In 1877, Budge, Tillmanns and Ranvier discovered that the hyaline cartilage possesses a system of lymph canals. In the same year, Gruber discovered that the malar bone and the superior maxilla participate in the formation *of* the infraorbital rim. Rudinger discovered protrusions of the ventriculus Morgagni above the larynx.

In 1878. Boll discovered the discontinuity of the medullary sheath and its composition of numerous medullary segments in the medullated nerve fibre.

In 1879, Rauber discovered the finer structure of the mammary glands.

In 1880, Izquierdo discovered the mode of the endings of sensory nerves of the cornea, Grandy's corpuscles and Pacinian bodies. In the same year, Ribbert discovered the development of the glomeruli Malpighii in the kidney. Tschiriew discovered that muscle fibre contains only motoric nerve endings. Ranvier discovered the structure of the salivary glands.

In 1881, Wagener discovered the development of the transverse striation of the muscles; in the same year, Flechsig the regular consecutive transformation of the non-medullated nerve fibres.

In 1882, Betz discovered in the finer structure of the cortex of the brain, five distinct regions marked by the form and situa-

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tion of its primary elements. In the same year Rawitz discovered the structure of the cells of spinal ganglia. Maier discovered particular ganglia in the walls of the urethrae and the bladder. Kolliker discovered contractile fascia of fibrillary structure.

In 1883, Ranvier discovered the modifications of the nerve roots that enter the medulla. The same made important new discoveries regarding the neuroglia.

In 1884, Toldt discovered the origin and development of the sphenoid bone. In the same year, Pfeiffer discovered secretory alveoles in the liver cells in connection with the capillaries of the liver. Simanowsky discovered the regeneration of the epithelium of the true vocal cord. Flemming discovered the cellular division in the germinal layers of the hair.

In 1885, Virchow discovered the passage of granular cells through the pellucid zone. In the same year, Trinkler discovered the structure of the mucous membrane of the stomach. Virchow discovered the structure of the ciliary zonula and of Petit's channel.

In 1886, Virchow discovered the form of the ciliary folds. In the same year, Gogenbaur discovered the rudiment of a septal nasal gland.

In 1888, Hill discovered the grouping of the cranial nerves. In the same year, Reinke discovered the finer structure of the horny formations of the skin. Panlisch discovered the anterior ending of the dorsal cord with the nasal crista. Ewetzky discovered the development of the naso-lachrymal meatus.

In 1891. Oppell discovered the lattice fibres of the liver and spleen.

In 1892, Trollard discovered the venous cavities of the dura mater.

In 1893, Vivante discovered the finer structure of the osseous tissue. In the same year, Michel discovered the presence of neuroglia cells in the optic nerve, the chiasm and the optic tract. Kolliker discovered the course of the nerves in the spleen, the kidneys and the biliary capillaries.

In 1894, Haidenhain discovered the giant cells of the bone marrow and their central bodies. In the same year, Korolkow discovered the nerve endings in the liver. Sclarussos discovered the endings of the finer nerve fibres in the male genitals.

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In 1895, Steil and Langendorff discovered a spinal center for the pupil dilating fibres of the cervical sympathetic. In the same year, Dogiel discovered the nerve endings in the margins of the eye-lid and in the conjunctiva palpebrarum. Boheman discovered the structure of the protoplasma bridges between the smooth muscle fibres of the intestinal tract. Leber discovered Schlemm's canal to be a true venous sinus of the sclera. Hey discovered the absence of glands and papillae in the normal bladder.

In 1896, Krompedier discovered the multiple indirect segmentation of the nucleus. In the same year, Reinke discovered crystalloid formations in the interstitial cells of the human scrotum.

In 1897, Morgenstern discovered that the odontoblastic layer of the teeth in each direction is penetrated by nerve fibres as well as the dentine; richest in nerves is the crown, the nerve fibres forming there a manifold reticulum. In the same year, Riche discovered that the deep head of the flexor pollicis brevis muscle is always provided by a small branch of the ulnar nerve. Tuschtschenko discovered that the sympathetic ganglia of the principal trunk and the abdominal ganglia have the same structure formation of multipolar cells. Kamkoff discovered a particular end apparatus in the Gasserian ganglion forming a terminal plexus surrounding the nerve cell.

In 1898, Agababow discovered that the fibres of the ciliary zonula are a median form between the elastic fibres and the fibres of the neuroglia. In the same year, Brukner discovered the finer structure of the thyriod glands. Stohr discovered the origin of the solitary lymph follicles of the intestine in the mucous membrane.

In 1899, Schwartz discovered the situation of the gangliar cells of the heart, in a circumscript area of the posterior wall of the atrium. In the same year, Blumberg and Heymann discovered the early rudiments of smooth muscle fibres in the small ligatures forming the predecessors of the ligamenta lata. Barbieri discovered two nerve plexuses in the wall of the arteries, one superficial and one deep. Loewy discovered the structure of the rete Malpighi in the epithelium of the male and female genitals.

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Most discovered the enormous abundance of lymphatic vessels in the scrotum. Dogiel discovered the sympathetic properties of the ganglia of the heart.

In 1900, Ballowitz discovered the finer structure of the cornea. In the same year, Helly discovered a new sphincter of the ductus choledochous independent of the muscles of the intestine. Foa discovered the finer structures of the stratified pavement epithelium.

In 1902, Grawitsch discovered in the epithelial cells of the vas epididymis particular tufts of hair.

PHYSIOLOGY AND PHYSIOLOGICAL CHEMISTRY.

Physiology is undoubtedly the sea of medical knowledge. Its breadth and depth are so great that it has become the speculative branch of all sciences.

Students of physiology throughout the world have turned every marked stone, thinking that they may discover some engraved sign of organic life, in order to bring out some unknown facts.

It would be impossible to enumerate the discoveries upon discoveries, theories upon theories, that have been advanced within the last twenty-five years. However, we will review the most important on this subject.

In 1876, Grimant discovered the synthesis of allantois. Gscheidlen discovered the presence of sulphuric compounds in urine. Rosenbach invented a method for testing urine for biliary pigments.

In 1877, Fleischl invented the Ortho-Rhenom, an apparatus for generating rectilinear current alterations in nerves. In the same year, Du Bois Reymond, Goltz and Hermann used the telephone for tetanizing nerves. Herman demonstrated the existence of phasio action currents in the forearm. Fick determined the relations between heat production and the total action of muscular spasm. Schiff found that the lingual nerve becomes motoric after the bisection of the nervous hypoglossus. Bouilland found the faculty for speaking and writing localized in the third frontal lobes of both sides of the brain, but that commonly only the left side is educated, corresponding to the preponderating exercise of the right side of the body. Ewald determined

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the speed of fluids in the capillaries. Berzold and Engelhardt found that the living retina is fluorescent. Mohr observed the action of eserin on the pupil and lens; Reurs, that of eserin sulphate.

In 1878. Schreiner isolated the Charcot crystals from the sperm. In the same year, Kuttner discovered that the ramifications of the pulmonary and bronchial arteries have numerous communications.

In 1879, Herman demonstrated the pressure necessary for the unfolding of atelectatic lungs. Stapff determined the maximum temperature for the working ability of man. Stilling theorized the occipital lobes of the brain as the seat of optic perception. Wildbrand discovered the conditions for the development of nystagmus. Francois Franok found the movements of the pupil governed by the sympathicus independent of the pressure in the ramifications of the carotid. Wurtz and Bondint isolated from the juice of Carioa papaya a new ferment, the Papain, of high digesting power. Leyden and Freinkel observed the respiratory exchange of gases in fevers. Hintzing determined the amount of carbonic acid in the muscles.

In 1880, Brown Sequard found that the dropping of chloroform on the skin of mammals (1-10 of the surface at least) caused immediate epileptiform convulsions, catalepsy, hemiplegia, and even death (by irritation of the skin nerves). Falk showed that the art of swallowing is caused by the contraction of the pharynx and not by the peristaltis of the oesophagus. Gudden detected the median course of the non-crossed fibres of the optic nerve. Duval and Laborde discovered the orgin of the nerve fibres for associate eye motions in the nucleus of the nervus abducens. Sohlet invented an aeromatic method for the determination of fat in cow's milk.

In 1881, Williams invented a new method to determine nitric acid in drinking water. In the same year, Musculus and Meyer devised a method for the conversion of dextrin into grape sugar. Pouchet invented a method for the destruction of organic substances in examination for mineral poison. Karl Roser advanced the theory that man and lower animals enjoyed immunity against the attacks of pathogenic fungi. Roser's theory was substantiated by Metchnikoff, and since then by Roux,

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Schulz and others. Langer determined the chemical composition of human fat in the different ages. Bookendahl and Landrvehr discovered the contents of a leukamic spleen. Moring determined the influence of diastatic ferments on starch, dextrin and maltose. Stadelman found that toluylendiamin causes strong and lasting icterus. Gerhardt invented new reactions for biliary pigments. Franok constructed a new apparatus for determining the total pulse of the principal vessels at any place on the skin. Sommerbrodt determined the reflectoric relation between lungs, heart and vessels.

In 1882, Bert and Regnard found that peroxide of hydrogen, even in minimum amounts, prevents fermentation. In the same year, Bert discovered that the blood of man and lower animals, living constantly in higher altitudes, is richer in haemoglobin than that of lower regions, a sequel of acclimatization. Vella discovered a new process for providing pure enteric juice. Ehrlich discovered the diazosulphobenzol reaction of pathologic urine. Francois Frank discovered that a compensatory venous stagnation of blood in the brain occurs when the heart, by the irritation of the vagus, is brought to a standstill. Roy has invented an oncometer to measure the volume of spleen and kidneys under different conditions of pressure or nutrition.

In 1883, Landruchr discovered a new carbohydrate, the animal gummi in the human body. In the same year, Colosanti discovered an active dissolving medium for uric acid in glycerine. Fischer and German discovered a new synthesis for skatol. Johnson introduced the picronitric acid as a reagent for albumen in urine, and for sugar the picramin test. Legal discovered that acetone and acetic acid produce Weyl's Kreatin reaction. Ppenchowski found that the vague and sympathetic nerves participate in the innervation of the cardia through Auerbach's plexus.

In 1884, Filipoff found that the inhalation of pure oxygen has no superiority over the inhalation of pure air, and that the inhalation of concentrated ozon is very irritating to the mucous membranes. In the same year, Gantier discovered a synthesis of xanthin. Rubner recommended as a test for grape sugar in urine, acetate of lead with ammonia. Fischer discovered in phenylhydrazine another new reagent for grape sugar. Neniki

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determined the chemical composition of anthrax bacilli. Salkowski determined the relation between the amount of haemoglobin and the number of red blood corpuscles. Landrvehr discovered a new method for the determination of glycogen in animal organs. Uffelmann discovered new methods for the discovery of free acids in the gastric juice, especially of lacetic acid. Salomon discovered the preparation of paraxanthin.

In 1885, Horbakczervski discovered a new synthesis of kreatin. In the same yeaf. Kossel discovered the adenin as a new base of the animal body, Houjean discovered a new method for the determination of the total nitrogen in animal bodies. Zaleski gave a new reaction for carbonous acid haemoglobin. Cybulski invented a new method for the determination of the blood speed by photography.

In 1886, Molisch detected two new reactions for sugar by means of napthol or thymol. Furbringer discovered a new method for testing mercury in animal fluids. Muller gave a new method for the quantitative determination of oxyhaemoglobin. Gaglio found lactic acid to be a regular ingredient of blood. Holootschiner found that human urine contains ptyalin and pepsin. Pohl described a method for the determination of globulin in urine.

In 1887, Brown Sequard and Bierfreund found that rigor mortis is a sequel of contraction of the muscles and not of coagulation. Grutzer discovered by a new apparatus that the muscle power is a function of the muscle tension.

In 1888, Steiger discovered a new carbo-hydrate, galactan. In the same year, Hoppe-Seyler discovered the methan fermentation of acetic acid. Kowalensky discovered the formation of methaemoglobin in the blood under the action of alloxantin. Magini and Maggiorani found means to increase or decrease the natural diamagnetism of human blood. Exner invented a microfractometer for the examination of living muscular tissue.

In 1889, Wersheimer and Meyer found that the gall always contains oxyhaemoglobin. In the same year, Jaksch found subtile reagents for the determination of melanin and melanogen in urine. Gartner observed the electric resistance of the human body against the Faradic current. Gross determined the dioptric indes of the living axis cylinder of nerves by the application of

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Exner's micro-refractometer. Lavaardemaker invented a double olfactometer for the comparison of olfactory impressions. Hermann observed the human phonation by means of chronophotographic measurement.

In 1890, Edington discovered the finer morphological structure of the formed elements of the blood. In the same year, Dastre, Nissen and Novi made new discoveries regarding the bile and its functions. Faffe found urethan as a constant component of urine. Biedermann demonstrated that the electric irritation of striated mural fibres causes a cathodic as well as an anodic long lasting spasm.

In 1891, Majert and Schmidt discovered the solubility of uric acid in piperazin.

In 1892, von Gehuchten found that the ganglia of trigeminus, glossopharyngeus and vagus are thoroughly analogous to the spinal ganglia. Lassar-Cohn demonstrated the presence of myronic acid in the bile.

In 1893 Tscherning invented the aberioscope for testing the homocentricity of the eye. In the same year, Landolt invented an ophthalmotrope for the study of the positions of the eye under the action of different muscles. Schultz determined the amount of sulphur in the different organs. Kelling found that the gastric juice often contains rhodan.

In 1895, Ott discovered nucleo-albumen in normal urine. In the same year, Nuttal and Thierfelder discovered that the presence of bacteria in the intestinal tract is not necessary for the preservation of life. Kaufman discovered that glycogen is a normal component of blood, and is highly increased in diabetes. Hurthle invented an apparatus for the microphonic registration of the cardiac sounds.

In 1896, Luntz and Schumberg discovered the increase of the volume of the heart by forced inspiration. Bock discovered the formation of photo-methaemoglobin by the action of sunlight on methaemoglobin solutions.

In 1897, Femiques discovered that the reducing substances of normal blood are mostly jecorin, a small part only grape-sugar. Albu discovered that fresh, pure human blood serum is poisonous to rabbits and other animals. Stokois discovered the precipitation of urobilin from the urine by phosphotungistic acid.

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In 1898, Petren discovered the presence of uric acid in normal blood. Zoller invented a method for the determination of bromine in urine.

In 1899, Leprince invented an eye polymeter for the examination of ptosis and other irregularities. Tscherning discovered that the spheric aberration of the refracting media of the eye is compensated by the accommodation.

In 1900, Rosenfield discovered the poisonous action of melanoidinic acid. Cavazzani discovered an oxydizing ferment in the cerebrospinal fluid.

In 1901, Pronazek discovered in microscopical preparations of glaucoma scintillans mesocytes. In the same year, Rothberger discovered a double antagonism between physostigmin and curare. Mentz discovered that the poisonous action of soaps when administered intravenously is caused by the fatty acids. Buch discovered that the sympathetic nerve in all parts is sensitive. Straub discovered that the refractive condition of the normal eye is hyperopic. Pfluger discovered a new biliary pigment, the biliruboidin.

CEREBRAL ANATOMY AND NEUROLOGY.

Within the last twenty-five years, Golgi, His, Kolliker, Cajal, and others have produced a complete revolution in ideas relative to the elements of which the nervous system is constructed. Golgi's method of staining tissues, and the illustrations of nerve cells and their processes thus obtained are undoubtedly valuable discoveries.

In 1877, Rudinger discovered the different courses of the gyri in brachiocephalic and dolichocephalic brains in males and females. In the same year, Sucherkandl discovered a new tumid formation at the basal surface of the corpus callosum.

In 1879, Schivable discovered that the ganglion ophthalmicum belongs to the oculomotor nerve and is analogous to the spinal ganglia. In the same year, Sapollini discovered that the hypophysis cerebri is covered only by the dura and pia-mater and not by the arachnoid.

In 1880, Duvol discovered a double origin of the hypoglossal and glossopharyngeal nerves. In the same year, Roller discovered the origin of accessorius Willisii in the anterior lateral

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group of the anterior column and the origin of the ascendent root of the nervus acusticus in the funiculus cuneatus. Stricker and Unger discovered a fine network formed of nerve endings and connective tissue cells and filled with a homogeneous or granulated mass; the same forms the connective substance of the nervous central organ. Golgi discovered a fine striation of the peripheric nerve fibres.

In 1881. Betz discovered five distinct layers of the cortex cerebri, a network of neuroglia, pyramid cells, the same more accumulated, round cells and spindle cells. In the tuber olfactorium he discovered a central ganglion. In the same year, Hammond discovered on the brain cortex gangliar centrum of giant cells situated directly above the horizontal arm of the fissure of Sylvius.

In 1882, Erlicki discovered the histologic differences between the two roots of the nervus acusticus, the anterior or ramus cochelaris and the posterior or ramus vestibularis. In the same year, Tuezek discovered the large amount of medullated nerve fibres in the cortex of the brain.

In 1883, Beevon discovered two kinds of fibres in the cerebellum, straight or not ramified and ramified or anastomosing.

In 1884, Luys discovered the course of the central white nerve fibres in three principal systems: 1, the fibres of the comissurae; 2, cortico-thalamical fibres; 3, fibres from the cortex to the corpus callosum and the nuclei subthalamici.

In 1885, Conti discovered that the thickness of the gray brain cortex with advancing age diminishes. In the same year, Karkschewitsch discovered that both parts of the roots of the accessory nerve are of the same nerve, none belonging to the vagus. Adamkiewicz discovered the nutritive capillaries of the ganglion cells. Onodi discovered ganglia aberrantia on the posterior roots of the medulla spinalis.

In 1886, Petrone discovered that the cells of the gray layers of the cerebellum are connected with the pia-mater.

In 1887, Tschisch discovered that the corpus striatem formed by the nucleus and putamen is connected with the outer capsule and the surrounding marrow of the hemisphere, but that there is no question of a particular corona radiata. In the same year, Dees discovered the structure of the nucleus of the acces-

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sorius which consists of rosary-formed groups of multipolar ganglion cells. Edinger discovered a direct sensorial tract of the cerebellum.

In 1888, Eichhorst discovered the boundary of the anaesthetic zone of the sensory intercostal nerves. In the same year Hartman discovered the anastomoses of the nervi ulnaris and medianus in the vola manus. Krause discovered the substantia nigra of the peduncli cerebri and the locus coeruleus to be central remnants of a single parietal eye. Martinotti discovered the finer structure of the occipital lobes of the brain. Luckerkandi discovered the course of the fornix fibres.

In 1889, Carpentier discovered the consecution of nerves for the orbita in the outer sinus wall as follows: oculomotorius, trachlearis, abducens, ramus ophthalmicus.

In 1890, Martinotti discovered at the outer rin of the brain cortex a characteristic layer of neuroglia cells. In the same year, Mansen discovered the bifurcation of the sensory nerve fibres.

In 1891, Langdon discovered free connection of the subarachnoidal with the subdural cavity and called it lumulate formaina.

In 1892, Kolliker discovered that the superior nucleus of the nervus oculomotorius belongs to the commisura posterior and called it therefore "deep nucleus of the commisura posterior."

In 1893, Fabonlay and Villard discovered the relation of the nervus recurrent to the arteria thyroidea inferior. Kultschitzky discovered a new method for the observation of the central nervous system. Kiriligew discovered the origin of the nervus chochlearis in the upper olica and the colliculus inferior eminentiae quadrigeminae. Sante de Wanotis discovered the course of the fibres in the corpus mamilare.

In 1895, Retzius discovered an analogue of the savons vasculosus of the teleostii on the human hyphophysis. In the same year, McCallan discovered communicating fibres between the nervi glossopharyngeus and faciales. Rohde discovered coarse and fine fibrillary hyaloplasmatic spongialplasma.

In 1897, Waldeyer discovered the development of the gyri of the cerebrum. In the same year, Terterjanz discovered the multipolaric nature of the gangliar cells of the superior nucleus trigemini. Unchirraga discovered in the human foetus a number

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of small arteries for the ganglion cervicale superius. Kamkoff discovered that the cells of the ganglion Gasseri show exactly the same behavior as the cells of the spinal ganglia.

In 1898, Frohse discovered a new kind of nerve ramification in the muscles. In the same year, Golgi discovered in the gangliar cells of the central nervous system and in the spinal ganglia of the terminal trunk, an endocellular network surrounding the nucleus. Ruzicka discovered the nucleali, i. e., small central corpuscles in the nuclear particles of the ganglion cells.

In 1899, Dixon discovered the nervus petrosus superficiatis major and the chorda tympani to be sensoric. In the same year, Muller discovered a new staining method for neuroglia.

In 1900, Benda discovered in the anterior lobes of the hypophysis larger chromatophile and smaller achromatophile cells. In the same year, Roncoroni discovered two types of ganglionic cells according to the staining or non-staining of their apophyses.

In 1901, Francois Franok discovered communications from the plexus vertebralis to the 6th-8th cervical nerves.

PSYCHIATRY.

The science of mental diseases or lesions is another speculative and theoretical phenomenon that has made great progress in the last twenty-five years.

In 1877, Rabow discovered changes in the volume and composition of urine in all cases of depressed mood of mind, which can be diagnosed to advantage. Westphal discovered a new psychosis marked by vivid uncontrollable and frequently returning ideas. He calls it abortive monomania. Berger observed the nature of nerve diseases caused by violent emotions, principally by fright. Davies discovered the therapeutic influence of monochromatous light on insanity and believes it to be psychic only.

In 1878, Kirm gave a new definition of periodic mental disturbances as particular attacks equal to each other and separated by interspaces of a lasting pathologic condition, not to be confounded with acerbations or recurrences.

In 1879, Luys discovered that under normal conditions, both halves of the cerebrum have in a way independent functions of each other, and that this is increased in mental disturbances.

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Kromer observed the particular behavior of the temperature curve in paralytic dementia.

In 1880, Beard gave a new definition of mental diseases as anomalies of the brain in which the psychic co-ordination is seriously impaired. Benedict discovered in thirty criminal brains a formation of the type of the four convolutions, like in the carnivora.

In 1881, Binswanger observed an increase of delirium in cases from fright or accident, such as railroad shock, etc.

In 1882, Crothers and Beard defined as trance, transitory conditions in which the patient's behavior is that of a conscious individual, but on recovery has no recollection. Bechterow discovered that in melancholia the temperature of the body is increased; with depression and stupor it sinks below normal. Modi observed that the reaction of the pupil on light irritation is lacking in paralytics. Tuczek discovered in the cortex cerebri of paralytics tangential fibres—fibres of association; and Westphal observed in dementia paralytica, the absence of the patellar phenomenon, though the walk is not atactic. Gnauck discovered in the hydroiodide of hyoscin a new hypnotic and sedative in mental diseases, but it must be used cautiously, and in small doses only.

In 1884, Macphail discovered that the amount of haemoglobin in mental diseases, absolutely and relatively is diminished.

In 1886, Furstner and Stuhlinger discovered gliosis and formation of cavities in the brain cortex in mental diseases.

Thomsen discovered sensoric anaesthesia in epileptics and hysterical patients.

In 1899, Binder discovered the relation of form anomalies of the ear to mental diseases.

In 1890, Whitwell discovered particular vacuoles in the pyramid cells of the frontal and parietal gyri of imbeciles. Korsakow discovered as a new disease "psychosis combined with multiple neuritis," called also, "cerebrópathia phychica toxaemica."

In 1891, Petersen observed that in chronic paranoia, optic hallucinations occur mostly in the right eye.

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In 1893, Whitmore Steele found in melancholy individuals a remarkable decrease in the amount of haemoglobin and the number of red blood corpuscles.

In 1895, Meyer and Meine discovered peptonuria in paralytics.

In 1896, Keay observed several cases of recovery from mania after scarlatina.

In 1898, Craig discovered the increase of normal blood pressure in cases of depression or melancholia, the decrease in maniacal irritations.

In 1899, Norman discovered the relation of mental diseases to aphasia.

BACTERIOLOGY.

Twenty-five years ago we only knew of the anthrax bacillus, which was discovered by Davaine. Its etiological relation to disease was so inviting to research that Kohn and Koch, Pasteur, Toussant and others were induced to make deeper investigations.

In 1877, Weigert introduced the solid culture media. This assisted Koch in his important work upon traumatic infectious diseases, which was published in 1878. Bolinger discovered the bacillus actinomycosis. In 1879, Hansen discovered the bacilli in the cells of leprous tubercles. The same year, Neisser discovered the gonococcus in the gonorrheal pus. In 1880, Eberth first observed the bacillus typhosus. In the same year Sternberg discovered the pathogenic micrococcus. In 1881, Koch discovered the tubercle bacillus. In 1882, Pasteur brought out the subject of rabies. The same year, Loeffler and Schutz discovered the bacillus of glanders and von Frisch first observed the bacillus rhinoscleroma.

In 1883, Friedlander discovered the bacillus of pneumonia, and Fehleisen discovered the streptococcus pyogenes. In 1884, Koch discovered the cholera spirillum and in the same year Loeffler discovered the bacillus diphtheritis; Nicolaier discovered the tetanus bacillus; Rosenbach, the staphylococcus aureus and albus; and Brieger's bacillus was likewise first observed in 1884. In the same year, Lusgarten devised a method for staining bacilli found in syphilitic tissue, which germs he assumed to be the cause of disease.

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In 1885, Passet discovered the staphylococcus citreus, and Hauser, the bacillus proteus vulgaris.

In 1886, Kreibohm discovered the bacillus crassus sputigenus, and Escherich, the bacillus lactic aerogenes.

In 1888, Passet discovered the bacillus pseudo-pneumonicus, and Weichselbaum, the bacillus endocarditides griseus.

In 1889, Pfeiffer discovered the bacillus capsulatus, and Booker, the bacillus of cholera infantum; Tizzoni in the same year discovered the bacillus of purpura hemorrhagica.

In 1890, the bacillus dysenteriae of Shiga was discovered.

In 1892, Pfeiffer discovered the bacillus of influenza.

In 1893, Abel discovered the bacillus mucosis ozaenae.

In 1894, Koch discovered the bacillus of infectious conjunctivitis, and the learned Japanese Kitasato discovered the bacillus of the bubonic plague of the Orient.

In 1895, Van Ermengen discovered the bacillus botulinus.

In 1897, Klein discovered the bacillus enteritidis sporogenes.

In 1900, the bacillus mortiferus was discovered by Harris. In the same year, van Niessen established the specificity of the bacterium of syphilis. Class discovered the diplococcus of scarlet fever. There are many other bacilli found in the various organs of the lower animals, and germs of various diseases both in the animal and vegetable kingdom which have been thoroughly established.

The question next arose, which is the best, surest and quickest way of obtaining cultures? Hundreds of methods have been suggested by the various bacteriologists all over the world.

MICROSCOPY.

The microscopist advanced in the mathematical optics and constructed the most perfect form of the present microscope. The progress in the principles of practical construction and the application of the theory has been so marked within the last twenty-five years as to produce a revolution in the instrument itself and its application. This work has been done particularly by the genius of Professor Abbe, of Jena. Cultures are now rapidly made and diagnoses easily established; but the main study of bacteriologists is, first, the prevention of germs; second, the germicide.

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Prevention lies in the hygienic surroundings of home comforts, which in late years has been established in all cities of 5,000 and over. The sewage system is so perfect that it no longer contaminates the water we drink, or the air we breathe. The habits, customs and morals of civilization have so improved that the question of infectious diseases has become a household discussion in all civilized countries. An enormous amount of work is done daily to discover the action of pathogenic bacteria, by means of metabolic products, and as a result of these labors animals have been rendered more or less susceptible to a number of different infections and intoxications, for instance, to chicken cholera; anthrax; erysipelas; symptomatic anthrax; malignant edema; hog cholera; typhoid fever; hemorrhagic septicaemia; vibrionic septicaemia; Asiatic cholera; diphtheria; tetanus; pneumococcus infection; pyocyaneus infection; proteus infection; infection or intoxication by bacillus coli communis, and infections by pyogenic cocci.

TUBERCULOSIS.

In 1888, the discovery of the antitoxic power of the blood was made, and Richet and Hericourt, of France, were the first who applied the actual principle of serum therapeutics. They reported before the French Academy of Sciences, the inoculation of lower animals with tubercle bacillus, and their encouraging results.

In 1889, Berheim and Lepine published their experiments with the serum of a goat upon a human subject, with beneficial results.

In 1891, Beretta reported a case of complete recovery from tuberculosis by the treatment of dog's serum.

RABIES.

In 1892, Babes and Lepp demonstrated the efficacy of the serum of animals inoculated against rabies.

TYPHOID FEVER.

Later, Brieger, Kitasato and Wassermann demonstrated the preventive or curative properties of the serum of animals vaccinated against typhoid fever. The experiments on both lower animals and human beings by Sanarelli, Chantemesse and Widal are worthy of note.

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PNEUMONIA.

Fox, Carbone, Emmerich and Fawetsky, the Klenyserers, Krouse, Panzini, Issaeff and others all injected in pneumonic patients the serum of vaccinated animals with only encouraging results.

ANTISTREPTOCOCCIC SERUM.

Lingelsheim and Behring, Roger, Mirornoff were discouraged in their work, but the aggressive Marmorek at last obtained effective immunization of animals with streptococci.

CHOLERA.

This work began with the illustrious Koch, in 1884, but the labors of Ferran, Gamaleia and Haffkine produced successful vaccination against spirillum of cholera, and many others report good results.

TETANUS.

Behring and Kitasato, in 1890, first vaccinated against tetanus.

In 1891, Tizzoni and Cattani followed these experiments.

In 1892, Brieger, Kitasato and Wassermann inoculated a mixture of a culture of tetanus spores and bouillon from the thymus gland, and many others since then, with flattering results.

DIPHTHERIA.

The antitoxin theory began with Behring and Kitasato in the last month of 1890. The publication of their explanation seemed so perfect that Ehrlich, Kossel and Wassermann, in Germany; Roux and Martin in France; Popoff and Metchnikoff in Russia, spread it like wildfire in the treatment of diphtheria, and it led to the adoption of it in this country.

VEGETABLE TOXALBUMINS AND VENOMS OF SERPENTS.

Here again, Kitasato, Wassermann and Behring began the study of poisoning by vegetable toxalbumins and venoms of serpents. All French bacteriologists followed up the study of these heroes. Calmette, Phisalix and Bertrand made a special study of the venom of the viper; at last, Calmette solved the problem of the orrhotherapeutic phenomena, and now the anti-venomous serum is adopted in India as a common treatment, where accord-

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ing to statistics, nearly 25,000 persons annually die from the bites of these animals. Recent reports from India show a remarkable decrease in the death rate from serpent poisoning.

HEREDITARY TRANSMISSION OF IMMUNITY.

Gley and Charrin have lately made experiments by injecting toxins into either one or both parents, for the purpose of transmission of immunity, and they hope to succeed in immunizing their offspring.

The origin of this work was the first hypothesis of Emmerich, who believed that anti-toxin was the result of the combination of the toxin with certain albuminoid materials of the blood, which complex compound he termed immuno-toxprotein. The work was continued by Behring and Nissen, on the vibrio of avian spepticaemia; by Zaslein on the spirillum of cholera; by Pfeiffer on hyper-vaccination; by Koch, on tuberculosis; by Roux and Vaillard, on tetanus; Kitasato, Tizzoni and Cattani, on diphtheria; and in various other branches such men as Eschereich, Mastbaum, Buchnor, Hankin, Bouchard, Metchnikoff, Ketscher, Klemperer, Popoff, Kondrevetski, and many others, too hard to mention, are daily working in their laboratories to perfect a serum for immunity of disease. Besides, there are thousands of others who are thorough believers in serum therapy as the future treatment for human ailments.

ASEPSIS AND ANTISEPSIS.

Ever since the germ theory has been thoroughly established, the study of asepsis and antisepsis has been propogated in every civilized country. Thanks to Lord Lister for the introduction of antiseptics, and their multiplication for both asepsis and antisepsis leads to preventive medicine, which will be the future treatment for eradicating disease.

In the last twenty-five years, antisepsis has made the following progress:

In 1878, Chiene recommended as an improvement in antiseptic dressing, the laying in of carbolized sponges instead of dressing paper. McGill introduced for this purpose carbolized oakum. In the same year, Hallwachs demonstrated the behavior of sterilized catgut, and sponges healed in the tissue of animals,

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showing their total resorption. Glaser demonstrated the germicide action of alumen exsiccatum.

In 1880, Bruns advised a preparation of zinc chloride jute for wound dressings in war, and for the antiseptic outfit of soldiers; Frisch for the disinfection of silk and sponges. In the same year, Weljaminoff made a modification of the Lister dressing by the introduction of ships oakum instead of jute.

In 1881, Chirone discovered the value of spectrum analysis for the determination of the relative worth of various antiseptics in their action on putrid blood. In the same year, Gosselin and Bergeron observed the antiseptic value of gaultheria solutions.

In 1883, Billroth, Mosetting, Moorhof and others adopted iodoform dressing. In the same year, Luoke introduced powdered sugar mixed with napthalin for the dressing of wounds.

In 1884, Kocher introduced a preparation of aseptic catgut treated with juniper oil.

In 1885, Konig devised a new method for the disinfection of rooms, hospitals, etc., by fumigating with sublimate, followed by treatment with sulphurous acid.

In 1886, Karstrom recommended bandages of wood shavings impregnated with sublimate.

In 1888, Angerer (Munich) advised prevention of the albuminous precipitations of corrosive sublimate by the addition of equal parts of common salt. Laplace (New Orleans) prevents this by the addition of small parts of any acid. In the same year, De Ruyter showed that iodoform is effective only in solutions. Reynolds introduced subiodide of bismuth, and Championierre, turf wool into antiseptic dressings. Esmarch introduced creolin into surgical practice.

In 1889, Davidson first advised the boiling of surgical instruments for sterilization. Ponpinel recommended heated air, and Bergmann and Renard superheated steam for this purpose. As there were many objections against catgut, Kocher substituted fine silk, but Gross first advised treating the catgut with chromic acid. Ware advised a simple aseptic catgut bottle with rubber covering.

In 1890, Perrons first ordered bleached sponges for surgical purposes. In the same year, Lister proposed a new antiseptic

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composed of double cyanide of mercury and zinc, with starch powder. Frendelenburg introduced hemp, or linen thread, steeped in sublimate solution.

In 1891, Terrier introduced sterilized wadding and dry dressing for wounds.

In 1892, as new antiseptics may be named: (Berlioz) Microcidine, ten times stronger than carbolic acid, but not poisonous; (LeGall) kaori-resin; (Sackur) dermatol and (Tacchini) chlorophenol. In the same year, Mansell Moullin first recommended sublimate baths in the treatment of lacerated wounds. Langdon and Lavrentieff recommended benzine for the disinfection of instruments.

In 1894, von Rizler introduced ammoniacal vapors; Gruber used cresol; Wolf, electrozone produced by electric currents in sea or salt water; Erand, alumnol; Emmerich, oxynaseptol; Blum, thiuret and formaldehyde; Pierce peroxide of hydrogen; Blaizot, fluoride of sodium; Spirig, sozoidol; Bruce-Clark, izal and ichthyol, as new antiseptics.

In 1896, the following new antiseptics were introduced: Morton, acetanilid; Ludv, airol; Schleich, sterilized and dried blood serum as sprinkling powder; Terry, bromine for gangrene, iodine; Eichengrum, iodoformin; Snow, coretin; Park, common mustard; Zuntz and Frank, nosophen; Stooker, oxygen gas; Girard, parachlorphenol.

In 1897, as a new antiseptic Crede introduced itrol (argentum ciricum) showing that silver salts are of high germicidal power in the blood serum.

In 1898, Blumberg recommended as disinfecting salts, argentamin and actol.

In 1899-1900, Blech recommended as antiseptics in pediatric practice; urotropin, guaiacol carbonate, antinosin and audoxin.

In 1901, Polak discovered in spiritus saponis kalkinus, a powerful agent for the disinfection of instruments.

In 1902, Crede found soluble silver and silver salts very effective antiseptics.

LOCAL ANAESTHESIA.

We now come to local anaesthesia, the real benefit to suffering humanity. Without anaesthetics the surgeon and the sp-

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cialist in the various branches of the healing art could not have advanced to the present status in the treatment of local diseases and injuries. It began in 1883, when the efficient and indispensable remedy, namely, hydrochloride of cocaine, was discovered by Koller.

In 1885, Filehne found antipyrin produced local anaesthesia.

In 1887, Corning recommended the use of tourniquets to the limbs where local anaesthesia is desired. In the same year, Brimmer recommended vibration as local anaesthesia for sensibility of the pulp in a sound tooth. Brown-Sequard found that an incision in the skin over the larynx will destroy cutaneous sensibility over two-thirds of the front of the neck, in lower animals. Lewin advocated the use of resin of piper methysticum as a local anaesthetic. Filehne produced local anaesthesia by the benzoyl derivatives. Reid claims that drumine is a powerful local anaesthetic. Goodman introduced gleditschine or stenocarpine as an admirable anaesthetic.

In 1888, Venturini and Gasparini discovered helleborin as a local anaesthetic. In the same year, Connor advocated a solution of one-tenth of 1 per cent. of the alkaloid of casa-bark. Liebreich recommended hydrochlorate of ammonium and the bromide and sulphate of ammonium to produce local anaesthesia.

In 1889, Beresowsky used ethyl chloride as a local anaesthetic. In the same year, Dobisch advocated a solution of chloroform, ether and menthol. Gley used ouabain and strophanthin.

In 1890, Monnet introduced a method of anaesthesia by means of freezing with chloride of ethyl.

In 1891, von Ziemacki introduced bromide of ethyl as a local anaesthetic. In the same year, Wiesendenger applied a metallic tube or chamber which is cooled by carbonic acid to produce local anaesthesia. Schleich produced local anaesthesia by hypodermatic injection of sterilized water.

In 1892, Chadbourne and Schweigger have used tropacocaine or tropsin as a local anaesthetic.

In 1895, Letang advised a new method of inducing local anaesthesia by cold.

In 1896, Mays recommended brucine.

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In 1897, Kiesel recommended beta eucain. In the same year, Heinz introduced holocaine and another local anaesthetic which he and Einhorn discovered and named orthoform.

In 1899, Luxenburger used nirvanine as a local anaesthetic. In the same year, White found liquid air to be an excellent local anaesthetic.

DUCTLESS GLANDS.

The latest investigations of physiology and pathology show that some of the ductless glands have great influence upon the nutritive changes in the body, and have the function of internal secretion. The spleen, thyroid, thymus, suprarenal capsules, hypophysis, parathyroids, carotid and coccygeal glands, tonsils and epiphysis all belong to this class of organs and have found their students within the last twenty-five years.

In 1877, Afanassiew discovered that the thymus during intrauterine life has the structure and function of a lymphatic gland; post partum, the structure is changed by the formation of concentric bodies and the removal of the follicles by connective tissue and fat.

In 1878, Ewald discovered that the extirpation of the spleen is without influence on the pancreas digestion.

In 1879, Zuckerkandl discovered a new gland situated above the os hyoideum and described it as glandula suprahyoidea. In the same year, Neumann discovered a metatastic goitrous tumor in the antebrachium.

In 1881, Rauber observed the structure of the suprarenal capsule. In the same year, Stieda discovered the epithelial origin of the thymus and thyroidea. Griffini observed the new formation of extirpated parts of the spleen. Tizzoni observed the blood-forming action of the spleen.

In 1882, Mitsurkuri discovered that the cortex of the suprarenal capsule is formed by the mesoblast, while the medullar parts have their origin in the sympathetic system.

In 1883, Herzen discovered that the zymogen of the pancreas by the ferment of the spleen is converted into trypsin. In the same year, Marchand discovered accessory suprarenal capsules in the ligamentum of neonati.

In 1884, Chiari found the same also in adults.

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In 1886, Prus discovered that the nervous sympathicus provides the thyroidea with vasomotoric—the nervus laryngeus with vasodilotoric fibres.

In 1887, Stilling discovered the lympathic nets of the corticalis of the suprarenal capsule.

In 1888, Macmunn discovered in the suprarenal capsules haemochromogen and a similar pigment in the urine in morbus Addisonii.

In 1889, Tolett discovered relations between the omentum and the spleen regarding their development. In the same year, Schwartz discovered that after the extirpation of the thyroid the electric irritability of the radial and peroneal nerves is increased; Ragowitsch discovered that after this extirpation the hypophysis is also altered. Wicklein discovered the formation of the spleen pigment.

In 1890, Tizzoni and Centani demonstrated that the extirpation of the thyroidea is always deadly, even after years.

In 1892, Vixirlow discovered that after the extirpation of the spleen products of chemiotactic properties accumulate in the blood. In the same year, Gley, Vassale and others discovered that a total extirpation of the thyroid gland causes cachexia. Albanese, Abelous and Langlois discovered that the extirpation of the suprarenal capsule is deadly, and that this organ destroys the neurin in muscular labor.

In 1893, Vassale and Sacohi discovered that the extirpation of the hypophysis cerebri causes phenomena similar to those in thyroidectomy.

In 1894, Eiselberg observed after total thyroidectomy anomalies in the growth of the long bones and the hair.

In 1895, Frankel discovered in the thyroid a cystalline body which in man produced an increase in the exchange of gases and fat. In the same year, Landenbach found after the extirpation of the spleen great irregularities in the blood composition which ceased after some time, the function being substituted by the bone marrow.

In 1896, Roos discovered that the therapeutic action of the thyroid is caused by the thyro-iodin.

In 1897, Cyon discovered that the iodothyrin of the thyroidea conserves the function of the nervous center for the heart

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and the circulation. In the same year, Gley discovered that the accessory thyroid gland contains more iodine than the thyroid itself.

In 1898, Livon discovered that besides the extract of the suprarenal capsule, also that of the hypophysis, the spleen, the carotid, the thyroid and the kidney causes an increase of the blood pressure and a retardation of the pulse.

In 1899, Hurthle discovered relations between the thyroid and the bile excretion of the liver. In the same year, Blum discovered that the thyroid gland is not an organ of excretion, but of poison destruction.

In 1900, Mendel discovered that the accessory thyroid glands contain relatively and absolutely more iodine than the thyroids; the thymus contains none at all. The extirpation of the thyroid changes the organic metabolism and diminishes the exchange of gases.

MEDICAL POLYTECHNICS.

The ingenious mechanical inventions which have been going on in the last quarter of the nineteenth century have no less been carried into mechanical therapeutics, hence medical technique has been cultivated to a large extent not only in improved instruments, but in many new and indispensable devices.

We could not well afford to take the time to mention all the instruments and their modifications, and will therefore only mention such as are original and new in character and which had nothing to take their place twenty-five years ago. Among those, in 1876, Schram invented the diaphanoscope.

In 1877, Nyrop invented the thermacaustic loop. In the same year, Bjornstrom invented the algesimeter (pain tester). Hanks invented the tracheotome. Paquelin invented the thermocautery. Justi invented the pharyngotome. Henry and son, of London, first prepared surgical cotton.

In 1879, Fano invented the photomegascope. In the same year, Rull invented the trachalotome. Libbrecht invented the iridectomy scissors. De Graudmont invented the refractions ophthalmoscope. Meniere invented the graphidometer. Chassagny invented the craniotripsotome. Trouve invented the electric polyscope. Skene invented the endoscope.

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In 1879, Lenhossek invented the polymicroscope. In the same year, Navratil invented the larynx dilator. Stein invented the sphygmophone and the phonoscope. Raynal invented the tonsillotome. Huter invented the cheilo-angioscope.

In 1880, Hensley invented the exploring aspirator. In the same year, Pean invented the mechanical osteotome. Gowers invented the haemacytometer and haemoglobinometer. Burgl invented the optometer. Hughes invented the audiometer. Gross invented the urethrotome and urethral dilator. Otis and Weiss invented the urethrometer. Morisani invented the goniometer.

In 1881, James invented the uterine dilator. In the same year, Hughes invented the aesthesiometer. Tanhoffer invented the cervix-amputator. Bithron invented the first ambulance wagon.

In 1882, Iltgen invented the cranioclast. In the same year, Crouzat invented the pelvimeter. Jennings invented the transfusion apparatus.

In 1883, Carl Seiler invented the septometer. In the same year, Placido invented the keratoscope. Hyernaux invented the haemostatic ligature clamp. Henry invented the scrotal clamp. McCaw invented the "Crane-agrafe" or "skull-grip."

In 1884, Wright invented the atometer.

In 1885, Dwyer invented the intubation instruments. In the same year, von Fleischl invented the haemometer. Kohlrausch invented the galvanometer. Lehman and Hener invented the chronograph counter and the chronograph telemeter. Schenk invented the thoracograph.

In 1886, Nyrop invented the first portable electric light to illuminate the various cavities in the human body. In the same year, Henocque invented the haemotoscope and the haemotospectroscope. Jones invented the mercurial fumigator. Smith invented the self-retaining nasal speculum.

In 1887, Senn invented the decalcified bone plate. In the same year, Gartner invented the ergostat. Whitla invented the systolometer.

In 1888, Cramer invented the commutator. In the same year, Garrigou Desarnes invented the manometric aspirator for

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the tympanic membrane. Harrison Cripps invented the colotomy dilator. Caw invented the athmoscope.

In 1889, D. Arsonval invented the electric chronometer. In the same year, Bonnier invented the clinical photophore. Kronecker invented the plethysmograph.

In 1890, the John A. Barett Battery Co. invented the Miliamperemeter. In the same year, Keiffer invented the omphalotome. Denison invented the rib resector. Hicks invented the therapeutical magnet. Schmid invented the hanging apparatus for spinal curvature.

In 1892, von Holowinski invented the rhythmophone. In the same year, Murphy invented his button.

In 1893, Norton invented the prostatotome. In the same year, Puttle invented the artificial rectum.

In 1895, Roentgen invented the apparatus for X-rays. In the same year, Klado first introduced the thermo-therapy apparatus.

In 1896, Herz invented the onychiograph.

In 1898, Kupferschmid invented the "cheiropadion."

In 1899, Saalfeld invented the dermoscope. Gartner invented the tonometer.

In 1900, Poulsen invented the telegraphone for the reproduction of the human voice.

In 1901, Vajda invented the urethro-calibro-dynamo-meter. In the same year, Scholder invented the arthromotor. Thole invented the zoniodiameter.

In 1902, Budingen invented the thorax pressure meter. Sloan invented the faradimeter. Gaertner invented the haemophotograph.

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Section—Practice of Medicine.

REPORT OF CHAIRMAN, H. C. ESCHBACH.

The honored and original conception of the province of a chairman's duties, was that he should record in his address the labors of his section in all parts of the world during the year. Inasmuch as volumes would now be required for such reports, I have thought best to make mention of only such features as make for decided progress in the medical world.

Medicine is both a science and an art. A science by means of its study of the phenomena of disease. An art in its application of means to control the ravages of disease. The study of pathology is the study of the science of medicine. Diagnosis and treatment—the art of medicine—are based on the principles of pathology, and can only approach the true art of medicine when so based. All the investigations in pathology may not be progress in the practical sense, yet when pursued in the spirit of truth, all lead to the desirable end of all investigation, by exposing the false and establishing on firmer basis the true, and therefore contribute to progress. The advance in the department of medical practice during the past year, while presenting no remarkable discoveries, has been steady, and resulted in some interesting contributions, which are suggestive of greater advancement to be made. And the increased interest manifested in thorough investigation and well systematized experimentation on all sides, is an earnest of good work and substantial, rather than ephemeral, progress in the future.

The serums and vaccinations are now being estimated at their real value. With reference to diphtheritic serum, its standing is so fully established that it is difficult to see how it is that there are still physicians of the regular school and good standing in their communities who will still oppose its use, on the ground of great danger, until the case has become one of mixed infection, when its delayed use must necessarily result in failure.

The pediatric society of Paris has again, within a year, adopted a resolution affirming its belief that the immunizing in-

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jection of antitoxin possess no serious danger, but confers immunity in the great majority of cases for some weeks. E. Müller graphically illustrates by statistics of the German cities as to mortality rates from diphtheria from 1889 to 1895, and F. Siegert gives the statistics of the five children's hospitals in Vienna for the same disease from 1886 to 1900, both showing a steadily lowering rate from year to year, and that the absolute as well as relative mortality underwent a tremendous reduction under the use of antitoxin, recalling Virchow's remark of the "brute force" of figures in overcoming all objections. A like charting of statistics of the cities and hospitals of this country, establishes the same fact. P. Jeffrier and E. Rozet recommend small doses of the antitoxin rather than the large doses, in order to overcome its harmful effect in producing anuria and the antitoxin rashes. George M. Gould points out that it is not correct to speak of these erythemas as antitoxin rashes. As it has been shown that the injection of serum not containing the antitoxin may cause the erythema. And it is clearly proven that the rashes depend not on the diphtheria antitoxin, but on the serum. Our own experience in this country shows the tendency is to larger doses than recommended by the French, and in this connection I wish to reiterate the conclusion of our honored president, some years ago. That with the general practitioner removed from the centers of laboratories and expert microscopists, the antitoxin should not be withheld until the microscope can confirm the diagnosis, but given when the clinical picture compels the diagnosis, leaving the microscope to confirm it later, if you please.

Of other serums, Ceni presents the study of the possibilities of the blood serum of epileptics. Eight cases of severe idiopathic epilepsy were treated with their own serum and that of other patients. Improvement was noticed in all and a practical cure *seemed* to occur in two. Pinto reports on the prophylactic effect of anti-plague vaccination as used at Campos, Brazil, during the recent wide-spread epidemic. Of 1,803 persons vaccinated, only one took the disease and that very lightly. Nearly all the vaccinated persons lived among, or were in contact with, plague patients. Vassal reports the mortality in eighteen cases

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of bubonic plague treated with the anti-plague serum as 38.8% as against 80.3% mortality in fifty-one cases not so treated. Novy reports the case of a student in the laboratory of the University of Michigan. The case was of the pneumonic type and the onset exceedingly rapid and grave. Within twenty-four hours 120 C. C. of serum were injected, with immediate good effect and ultimate complete recovery.

As early as ten years ago, G. & F. Klemperer stated that when a specific "pneumococcus" enters into the animal body it generates a poison which they named "Pneumotoxin," upon which poison the phenomena of pneumonia depends. After a few days another substance is developed, "anti-pneumotoxin," which neutralizes the pneumotoxin and arrests the pyrexia. As soon as sufficient of the anti-pneumotoxin is produced to neutralize all the pneumotoxin, the crisis takes place and convalescence is established. On this finding is based the serum treatment of penumonia. Burney Yeo asserts that trials on a large scale will certainly be made of this method and conclusions of authoritative value arrived at before long. Seers presents a study of twelve cases of pneumonia treated with anti-pneumotoxin serum contained with other measures. No ill effects occurred, but the extravagant claims as to the effect on special symptoms, receive but little support from his experience. Goldsborrough reports nine cases treated with the serum with two deaths, he believes in a decided curative effect of the serum. In the 447 cases of pneumonia reported as being treated with the serum, the mortality was 16.5%. In many of these cases the treatment seems to have been combined with other well tried procedures, so that its practical curative value is not clearly established.

Leyden reports fourteen cases of scarlet fever treated with the serum from convalescents with what he regards as favorable results. Five cases showed marked improvement, while in nine cases it was slight. In general the duration was shortened, and in none did nephritis follow.

Luediking reports several cases of streptococcus infection treated with the anti-streptococcus serum, with advantage, and holds that its early administration in fitting cases will prove life-saving. That its failures are due to, first, variability of strepto-

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coccus; second, to the fact that few septic processes in man are due to pure streptococcus infection; third, the late employment of the serum, and fourth, the inertness of many of the serums on the market. Lenhartz reports a number of cases of septic endocarditis in which he believes the patients were made worse by the use of the serum rather than improved. Cooper and Ogle report a case of septic endocarditis treated with the serum in which the temperature was favorably affected by the injections, but a fatal issue was not averted.

Birt reports the result by vaccination with a sterilized culture of typhoid bacilli, during the epidemic of typhoid fever at Harrismith, South Africa, from September, 1900, to September, 1901. In this period there were 1,210 cases of the malady. Of these 947 were not vaccinated and showed a mortality of 14.25%. Two hundred and sixty-two were vaccinated from six to eighteen months before and only gave a mortality of 6.8%. In all the inoculated cases, the disease was modified in severity, whilst the unvaccinated had the malady in very severe type.

Dr. Simon Flexner has made investigations with the dysenteric antitoxin, and the well known ability of Dr. Flexner gives us the hope that his investigations may bring forth good results, but so far no reports of his work of value, have been received.

Ager cites a case of acute tetanus treated with its antitoxin and resulting fatally. Möllers reports four in which the remedy was given within thirty hours of the recognition of the symptoms, all being fatal. Pfeiffer reports twenty-two cases and has collected ninety-three, treated by the antitoxin, with a mortality of 52.7% in those upon whom Behring's antitoxin was used, and 36.3% in cases treated by Tizzoni's serum, and forms the conclusion that tetanus in Italy runs a milder course than elsewhere.

Leyden states that the subarachnoid injection of the antitoxin has been used eleven times in man, with six deaths and five recoveries, all severe cases. The technique is the same as for lumbar puncture, the object of the spinal injection is to reach rapidly the toxin located in the anterior ganglion cells.

During the year, the discussion raised by Koch as to the identity and intercommunicability of human and bovine tuber-

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culosis has gone on. Ravenel reviews the entire subject and reaches the conclusion that the evidence forces us to the opinion that human and bovine tuberculosis are but slightly different types of the same disease and that they are intercommunicable, and that *bovine tuberculosis* is a menace to public health. Hamilton at the British Medical Association of 1902, stated that it will be generally conceded that whereas bovine tuberculosis excites as a rule a tuberculosis in cattle far more widespread and acute than that from the human organism, yet we are now in possession of evidence that shows the conclusion of Koch and Schütz are far too absolute.

It is proven beyond peradventure that the bacillus taken from man can excite tuberculosis in bovines when introduced by inoculation. It has also been shown that the human bacillus thus acclimatized on the system of the cow gains in violence by successive transference from one host to another until in time it becomes almost as virulent as that which is peculiar to the bovine tribe. Adami believes that there are marked difference between human and bovine bacillus, but not sufficient to warrant an assumption that they are different species. The evidence at hand is decidedly adverse to the tenability of Koch's theory. The prevailing opinion being that of Ravenel, Hamilton and others, that the difference between the human and bovine organism is none other than one of degree and that there should be no relaxation of our state health laws.

Stern insists that the so-called four weeks cure for pulmonary tuberculosis is of great value, for by being cared for throughout this length of time in properly regulated institutions, the patients become habituated to proper methods of caring for themselves. The results of treatment for this period, of themselves, are useful, but in the large proportion of cases, the improvement appears afterward as a result of the care which the patient takes of himself. Far advanced or rapidly advancing cases would show but slight results. It is to be hoped that continual investigations along these lines may result in greater control of this universal and great scourge of the human race.

Considerable progress has been made in determining the value and limitations of Rontgen and Finsen rays, radiotherapy,

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actinotherapy and the various form of light treatment during the year. The substance of the year's progress is that in the various forms of cutaneous affections as lupus, tuberculosis of skin, carcinoma, and other malignant manifestations, the various forms of light treatment may be employed with hope of benefit, but should be in the hands of no one but the medical profession, who have received special training in this line of work. In this connection. it is interesting to note the suggestion of Booth, as to the possible utilization of the properties of the new element radium in the treatment of the same diseases in which X-rays and other forms of light have been found useful. Becquerel accidentally produced a burn on himself by carrying a few dicigrams of radium inclosed in a glass tube, in his vest pocket. Currie noted the same effect from radium. The author suggests the possibility of this new element producing all the effects of the X-rays.

The review of the work of the year demonstrates the fact that the greatest work has been done along the line of infectious diseases, whilst organic diseases of the heart, kidneys, liver and disturbances of metabolism have received slight attention. For this reason I decided that the program of this section should be made up of a symposium on the general subject of diseases of the kidney, for the reason that I believe, we, as a profession, know as little of value on that subject as any. From the numerous refusals to prepare papers pertaining to various phases of this subject, on the grounds of not knowing enough about the disease to write intelligently, I am convinced that I did not misjudge the necessity for further study of this branch of our investigations. Having failed to carry out my original intention, through no fault of effort on my part, I have filled out the program with papers on other subjects of equal importance, the merits of which will, I believe, appeal to you.

I take pleasure now, in presenting to you the gentlemen who have kindly contributed to the program of this section, all of whom are well known to you, and bespeak for their papers a cordial hearing.

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FUNCTIONAL ALBUMINURIA.

EDWARD L. ROHLF, WATERLOO.

Owing to the limited number of cases of this nature that are investigated by us in general practice, especially when we are negligent in not even looking for them, nor prepared in a great majority of cases to make a proper investigation when we do have a case. It would be impossible to gain new knowledge rapidly and develop a paper which would be new and strange to all present. I hope, however, from research of literature, and experience of two cases, to place out a few switch lights, that shall guide us to safe conclusions with our train of unfortunate mortals who come to us for transportation to the station of health, preventing the disastrous result of running into an open switch. Albuminuria, whenever discovered, is of extreme interest to the clinician and its proper interpretation of vital importance to the patient. However, in the light of our present knowledge about the conditions that may become causative factors, and supported with many methods for chemic and microscopic urinalysis, the presence of albumin in the urine does not fill us with the same solicitude for the future welfare of our patients today, as it did the medical profession not many years since; when it sounded the keynote to a funeral dirge, as it were, it being considered the infallible symptom of some form of degenerative disease of the renal structure, acute or otherwise. While we recognize that albuminuria, due to pathologic change, inflammatory and degenerative in the kidney, is beyond question the most important and usually the most serious form, we must also recognize that we have certain disturbances of the renal function that give rise to the presence of albumin in the urine, often curative, and leave the structure unimpaired, the histological changes if any did occur being but transitory, therefore the term "Functional Albuminuria." The quantity of albumin in this condition is usually small from a mere trace to 0.1 to 0.2% of 1%. Its origin is still a matter of conjecture. Authorities differ, some claiming it may come from the glomeruli. Most modern authors believe it occurs here only when these are diseased or when blood pressure is abnormally

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great in these structures. Von Noorden and others claim its origin in the tubular epithelium, these cells being subject to successive disintegral changes. If of slight degree, and amount of albumin but mere traces at intervals, it is considered functional albuminuria; if, however, the tubular epithelial cell degeneration is increased and continuous, due to disease, a pathologic albuminuria results. This theory is supported by the fact that nuclo albumin, which has its origin in the cell protoplasm, is always found in normal urine. Runeberg holds the opinion that it is due to low blood pressure in the glomeruli, and has experimented on dead animal membranes to demonstrate his theory. This theory has not been fully accepted, as his experiments are not to be compared to the living renal function. As causes we might consider:

1. Alterations in blood pressure in the kidney not long continued.

2. Abnormal change in the quality of blood elements, or the presence of normal products in the blood, rendering the serum albumin more diffusible.

3. Marked disturbance of vaso-motor control of the coats of the kidney blood vessels reflexly.

4. Diet, posture, violent exercise and cold bathing.

In the first cause mentioned we would call attention to pressure upon the abdominal veins, by ovarian cysts, uterine fibroids or gravid uterus. The chemical analysis may reveal the presence of albumin in the urine, and the microscope a few casts, but after the radical removal of the cysts or fibroid, or the natural termination of pregnancy the albumin soon disappears, and does not reappear in most cases, not even in all succeeding pregnancies. Sudden exposure to wet and cold may produce such an abnormal congestion of the internal organs, that albuminuria results, yet when normal equilibrium in blood pressure has been re-established the albumin disappears. Cardiac disease producing hypostatic congestion of the kidneys will cause an albuminuria which disappears as the cardiac condition improves under treatment, and the renal congestion is relieved, providing favorable treatment is instituted before permanent pathologic changes have occurred in the histologic elements of the kidney tissue. (Cardiac valvular disease of R. heart with broken com-

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pensation a hindrance to return veinous flow from the kidney).

Under the second condition of causes we would mention first pernicious anaemia, the impoverished nutrition to the cardiac muscle cells lowering its propelling power, an element for general hypostasis, and to the renal cells, lowering their normal tone, may in part account for the albuminuria. In haemoglobinemia, phosphorous and carbon-monoxide poisoning the quality of the blood may be so altered as to permit transudation of the serum-albumin into the kidney tubules. We are also aware that the kidney structures may be so affected that the renal disturbance offers an explanation for the albuminuria present in these cases. Many of the febrile albuminurias, I believe, should be classed under this head. As the severity of the infective process changes the quality of the blood and the usual accompanying pyrexia produces such marked effects upon the glomeruli that albuminuria results, which disappears in all but a small percentage of cases when the patient recovers. What changes do occur in the histologic elements of the renal tissue are so transitory that no permanent or progressive condition is produced, and normal function so slightly interfered with that it is impossible of demonstration. Scarlatina is perhaps the most liable to produce permanent gross renal tissue changes, which the clinician should be able to recognize by accompanying symptoms and pathologic elements usually present in the urine.

Under the third division of causes I desire to cite a case which I believe belongs to this class. Mr. M., age 20, well developed, with good family history, suffering with recurrent appendicitis, pain and tenderness continually present, with acute exacerbation, operation was advised and readily consented to. Upon urinalysis, albumin, about one-eighth of one per cent., was discovered present in the urine. No casts were found with the microscope, quantity, reaction, sp. gr. and other constituents normal. Patient was informed of his condition, placed on diet, and instructed to bring specimens of urine to the office. Repeated urinalysis of twenty-four hour specimens, and specimens voided at different times of the day for a period of three weeks revealed no change in his condition. Albumin continued to be present in the same quantity. There being no edema or unfavorable cardiac symptoms, operation was performed with chlor-

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oform anaesthesia. Recovery uneventful. Repeated urinalysis since, both chemic and miscroscopic, with patient on regular diet, has failed to detect any albumin or casts. I draw this conclusion that the continuous irritation from the chronicly inflamed appendix produced enough reflex vasor-motor disturbance through the sympathetics that it became the causative factor for albuminuria. Dietetic albuminuria, a term used by some of our writers, may be classed as functional, as the albuminuria subsides, when the ingestion of large quantities of proteid food is discontinued. Diet may be a feature in albuminuria of adolescence, and cyclic albuminuria. Albumin appearing and subsiding very markedly in the urine in proportion to the amount of the proteid food consumed at varied periods of time, which point to be studied by the clinician in a given case

Perhaps the most interesting functional albuminuria about which much has been written is termed by the writers "Cyclic Albuminuria," the cycle either occurring in the morning, being at its maxim about noon and slowly declining towards evening, or its maximum may not occur until the afternoon hours, again cases are reported where a double cycle occurred, one during the morning hours, declining about noon, and another appearing during the afternoon; but in all the cases albumin ceased to appear in the urine soon after the reclining posture had been assumed, this feature giving rise to the term "Postural Albuminuria." I take it that cyclic and postural albuminuria are so closely allied that it would be difficult to draw a distinguishing line between them. Cyclic albuminuria occurs mostly in the young and adolescent, usually of an anaemic or neurotic type, yet many times in apparent good health; it sometimes occurs in adults. The quantity of albumin passed is usually slight. Diet and exercise have no influence on the albuminuria as a rule. Yet cases have been reported where the quantity of albumin passed was increased. Pulse tension is not increased. Aortic sounds remain normal. Pathologic renal elements do not appear in the urine. Rarely a few hyaline casts. Posture having the most marked influence. Cyclic albuminuria is frequently discovered by accident, many times in adults when being examined for life insurance. This has made it a subject for much discussion by life insurance companies and their medical ex-

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aminers. Here the importance of a differential diagnosis of functional from permanent albuminuria is very apparent. The applicant and his family should have the benefit of protection if functional, while the insurance company should be protected from a poor risk if progressive. In these cases the local examining physician becomes an important factor, as it is his skill, perseverance and good judgment in discovering and setting forth the facts in the case, that will permit of justice being meted out by the higher officers of the organizations. It may be months and even a year or more before a positive diagnosis can be made of cyclic albuminuria, as it frequently extends over a period of years. We must also bear in mind that all cases are not curative; in rare cases insiduous degeneration of the renal structure occurs during the years of persistent albuminuria that it terminates in chronic nephritis.

Diagnosis of any variety of albuminuria of functional or other origin rests first upon the detection of albumin by any one or more of the reliable tests, which I need not enumerate here. The quantity of albumin and persistence of its presence must next be ascertained, this is very important, for in progressive renal disease albumin is persistent and in considerable quantity, together with casts. However, in interstitial nephritis albumin may be absent at intervals, and when present only in small quantity. The same is true of functional albuminuria. We must then look to the etiology and make proper inference concerning it, as an aid toward arriving at proper conclusions. The age of the patient, the presence of acute febrile or infectious diseases, disease of the heart or lungs, presence of abdominal tumors, pregnancy, chronic affections of abdominal viscera, gastro-intestinal disturbances, exposure to cold or wet, bathing, diet, amount of exercise indulged in, and the condition of the blood, all must be carefully considered. Differential diagnosis, functional albuminuria is more or less inconstant, albumin small in quantity, seldom find casts, heart sounds and condition of arteries not affected unless an element in the etiology, usually curative. In albuminuria due to gross renal tissue changes, we have constant presence of albumin in considerable quantity unless of the interstitial variety, when it may be slight or entirely absent for short intervals, simulating functional albuminuria.

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A progressive loss of strength, waxy complexion, increased arterial tension, cardiac hypertrophy, accentuated aortic sounds, dropsy, variation in quantity sp. gr. and color of urine, the presence of granular, hyaline, epithelial and tube casts with prodromic symptoms of uraemia ought to prevent a mistake in diagnosis. I want to mention the centrifuge as an important aid for the detection of casts.

I now desire to report a second case where the cyclic appearance and postural disappearance of the albumin in the urine made a diagnosis of interstitial nephritis extremely difficult and lead to a mistake. What few symptoms were complained of, and the general physical changes present, which might have been referable to the chronic nephritis, could well be explained by the presence of other pathology for which she sought relief, which was surgical. The presence of a small quantity of albumin in the urine in the manner above described being the only evidence of kidney disturbance. In the absence of casts, I felt it was a case of functional albuminuria and advised an operation, which was performed with chloroform anaesthesia, patient rallied nicely, and although small quantities of albumin continued to be present no untoward symptom appeared for two weeks, when anorexia, nausea, vomiting, diarrhoea, dry brown tongue, symptoms of real kidney lesion manifested themselves. Urinalysis revealed a polyuria of low sp. gr. increase in the albumin, and the presence of casts were the unmistakable evidence of the interstitial nephritis. I feel the length of time spent previous to the operation for an investigation was too short and an error, which is my reason for reporting it, as we often have to learn valuable lessons through mistakes. The prognosis of functional albuminuria is good, the majority of cases recover, occasionally cases continue until chronic nephritis results. There is little to say about treatment. Long periods of rest for the cyclic or postural variety, correct diet and hygiene, if at fault, and apply surgical or medical treatment to the causative factor when determined in other cases.

In conclusion, I desire to say that I believe functional albuminuria is more frequent than we have been lead to suppose. Its detection depends upon more thorough investigation. Repeated examinations at different periods of time, to determine the quantity, permanency and source of albumin are essential for correct conclusions about its being functional or pathological. Lack of investigation leads to error in diagnosis.

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Discussion on the Paper of Dr. Rohlf.

DR. E. J. WADDEY, of Waterloo.—The essayist has given us a good practical paper. He has omitted one point, however, which I think is very important in the management and diagnosis of these cases, and that is in regard to the differential diagnosis from bladder conditions and questionable conditions of the kidney. We get patients with albumin in the urine, complicated with functional trouble. This subject also opens up the functional reflex neuroses, as is shown in various reflex troubles, as in the case of appendicitis he reported. We have many pathological conditions that show albumin in the urine that are not properly diagnosticated, because of the train of symptoms being incomplete. The use of the microscope and careful and close examinations, with clinical tests for albumin in the urine, usually give us an insight into these cases.

I have nothing further to say, as the essayist has covered the ground quite completely.

DR. WALTER L. BIERRING, of Iowa City.—The paper suggested many interesting points. There is one thing I would like to emphasize, and that is necessary care in diagnosing cyclic or functional albuminuria from albuminuria due to organic change. Its seems to me, it is a good plan, in a person of young age, in whom there is cyclic albuminuria, to suspicion some functional disturbance. In every cyclic albuminuria that occurs after middle life, especially in chronic nephritis, albuminuria is often present in small amount, it is often cyclic, and simulates functional albuminuria in many respects.

DR. ROHLF (closing the discussion).—In answer to Dr. Waddey in regard to not differentiating between functional albuminuria and adventitious albuminuria, I believe that frequently in making a urinary examination the pathologic elements which are found in conditions of these organs to cause albuminuria would be enough to make a diagnosis of functional trouble, because in functional albuminuria we have no pathologic elements present except albumin.

I wish to thank the gentleman who made the suggestion to consider age in reference to functional and permanent albuminuria. It is an excellent suggestion, and I appreciate it.

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ACUTE PARENCHYMATOUS NEPHRITIS.

LUTHER STEVENS, DES MOINES.

The various inflammations of the kidney have been named and renamed, divided and subdivided, until when one attempts to look up the literature on the subject, he finds endless and well nigh hopeless confusion.

The subject, Acute Parenchymatous Nephritis, was assigned to me by the distinguished chairman of this section, who inveigled me into consenting to read this paper before I knew the subject's breadth or my own limitations, and all I can hope to do is to save some of my colleagues some time an effort in looking up the subject. I shall present briefly, indeed almost categorically, a review of the subject, illustrating the same by a few case histories and offering a few suggestions, perhaps.

Clinically there are two general classes of nephritis, acute and chronic, the dividing line being one that is not fixed except for classification purposes. The adjectives used to denote the modifications of both acute and chronic nephritis refer to the pathology, anatomy, etiology or symptomatology, and are so numerous that one in attempting to bring them all into review almost needs a card index cataloguing system with 200 alphabetical subdivisions.

Synonyms used with the term acute parenchymatous nephritis are acute nephritis, acute Bright's disease, acute diffuse nephritis, acute exudative nephritis, acute hemorrhage, acute glomerular, acute desquamative, acute croupous, acute catarrhal, acute tubal, acute interstitial and acute exacerbation of chronic nephritis.

Hektoen states that the same clinical picture may be produced by different forms of kidney disease, and that at the autopsy table it is a frequent experience to find advanced renal disease in cases in which there were few renal symptoms and that severe clinical manifestations apparently referable to the kidneys may exist with almost normal kidneys.

Etiology. First in importance are the infectious diseases,

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including gonorrhoea and syphilis and particularly the exanthemata, and of these especially scarlet fever.

2. Exposure to damp and cold when the resisting power is weakened from alcoholic excesses, illness or over-fatigue.

3. Toxic drugs, e. g., cantharides salicylic and turpentine, copaiba, phosphorous, arsenic and lead.

4. Pregnancy with abnormal conditions existing concurrently.

5. Traumatism to the kidney or that affecting the portal circulation.

6. Injury to or chronic diseases affecting large surfaces of the skin, particularly burns.

7. Intestinal intoxication when frequent, prolonged or severe.

8. Chronic nephritis.

9. Diseases attended by jaundice, anaemia, prolonged hyperexia, e. g., pneumonia, meningitis, septicaemia, tuberculosis, malaria and endocarditis.

Morbid Anatomy and Pathology. A pathologic nomenclature based upon the anatomic structures certainly gives the most systemic classification. Probably most, if not all, inflammations of the kidney primarily are parenchymatous but soon the interstitial tissues are also involved. In severe tubal inflammation the glomeruli are also apt to be affected and vice versa.

Microscopically the appearances are best stated by quoting from Thompson's "Practice of Medicine": "The color varies with the quantity of blood from a dark-red hyperaemic to a pale yellowish anaemic hue. The capsule is stripped easily, leaving a smooth surface mottled by venous injection with patches of anaemia, or by hemorrhagic spots. On section the markings are indistinct; the medulla is dark, and the cortex pale. Microscopically the changes are chiefly in the cortex. The glomeruli are large, distinct, and red, or in poison cases they are pale, and there is proliferation of their capsular epithelium (glomerulonephritis). There are cloudy swelling and hyaline and fatty change in the cells of the convoluted tubules, where coagulation necrosis is decided in cases due to toxic agents, and where many casts appear. Minute hemorrhages take place in Bowman's capsule and around the tubules, and the vessels show hyaline

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degeneration. Both glomeruli and tubules are filled with degenerated epithelium, leucocytes, and granular detritus. In severe cases only, the spaces between the tubules exhibit serum and blood-corpuscles of both kinds, with round-cell infiltration. Of all these changes, the most prominent are those of the epithelium. * * * An acute interstitial nephritis is found in the acute fevers of childhood. Councilman, in a study of forty-two cases, describes the initial lesion of this type of acute nephritis as an accumulation in the interstitial tissues of leucocytes and of cells derived from capillaries and venules, and from the connective-tissue cells of the glomeruli; there is also a secondary degeneration in the tubular epithelium."

In acute diffuse nephritis the urine possesses the following typical characteristics, quoting from Purdy: "The quantity is invariably diminished, and sometimes extremely so. At the height of the disease but few ounces of the urine may be voided during the whole twenty-four hours; but later on, if improvement occur, the quantity gradually increases until the normal volume or even more, may be reached. If the quantity of urine rise above the normal it may be taken as an evidence that the acute character of the disease is modified, and the tendency is toward resolution. On the other hand the urine, at the very height of acute nephritis, may become practically suppressed. * * In the early and very acute stage of the disease the specific gravity of the urine usually rises above normal, often reaching 1025 to 1030 or even higher. With continuance of the disease the tendency is toward a lowered specific gravity of the urine, corresponding with the increased volume. The color of the urine varies considerably at different periods of the disease, the variation depending in part upon the quantity of the urine voided, and in part upon the quantity of contained blood. As a rule, the color of the urine is dark, more or less approaching chocolate color. * * * The chemical reaction of the urine, uninfluenced by medication, is always sharply acid. * * * The gross solids for twenty-four hours are always reduced. * * * The urine contains albumin invariable, but always large amount in acute nephritis. It may reach as high as 2 per cent., or even more by actual weight; so that upon coagulation it nearly fills the test tube. More frequently, however, the range is in the

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vicinity of ½ to 1 per cent.—5 to 10 grammes per litre (Esbach's method). A few cases of acute nephritis following scarlatina are recorded, in which the urine was free from albumin. It is, however, rare in such cases that albuminuria is absent throughout the whole course of the disease; more often it is of sudden onset at some stage, and occasionally it has been observed in intermittent form. * * * The presence of blood in the urine may be regarded as one of the essential features of this disease. * * * Haematuria is developed early, being in most cases among the first symptoms noticed, while it usually subsides much earlier than does albuminuria. * * * The urinary sediment in acute diffuse nephritis is large in quantity, usually brownish in color from admixture with blood, urates, and coloring matters. Microscopical investigation of the sediment discloses the presence of red blood-corpuscles in larger or smaller numbers. * * Renal casts are present in large numbers, and may have attached to them (a) blood-corpuscles, (b) leucocytes, (c) renal epithelium. (Fig. 40)."

Symptomatology. The symptoms vary according to the onset of the disease, whether it develops suddenly or slowly. If the onset is sudden, there is very apt to be a severe chill, followed quickly by a rise of temperature to 102 or 103 degrees, accompanied by dull, heavy aching in the region of the kidneys; severe vomiting occurs, the skin is apt to be dry, but following the fever there may be profuse perspiration with distinct uriniferous odor; the oedema or anasarca develops rapidly, the urine decreases, is very dark in color, or may be bloody, containing epithelial debris, albumin and blood casts, headache is severe, and mental dullness, stupor or coma ensues, followed by typical uraemic convulsions.

In cases developing slowly, the decrease in the quantity of the urine may be the first symptom noted. If not, oedema of the eye-lids is the first symptom noticed; pallor is noted, but it is not nearly as marked as in chronic nephritis. The urinary changes and other symptoms are the same as in the sudden type but the changes come on more slowly. The urinary changes were spoken of more in detail under the sub-head, Pathology.

Diagnosis. The diagnosis of acute parenchymatous nephri-

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tis, if attention is paid to the urinalysis, case history, nervous symptoms and oedema, is not difficult.

Prognosis. In general it may be said that the prognosis relative to mortality is good, but relative to morbidity only fair, as approximately one in ten is apt to be left with chronic nephritis or permanent structural modifications of kidney tissue. Of eighty-eight cases of scarlatinal nephritis reported by Bajinsky, of Berlin, eleven died, a mortality of 12%. If there is complete suppression of the urine, or uraemic convulsions occur, the prognosis is exceedingly grave. The duration of the disease is ten days to four weeks. If it lasts longer than that, it is very apt to become a chronic type of nephritis. Recovery is much more apt to take place in the young than in those past middle age. As long as albumin continues in the urine, it cannot be considered that recovery has taken place.

Treatment. In all acute diseases, as well as chronic, the most essential feature is wise management, which will include absolute rest under the most favorable conditions that are obtainable with the best possible trained attendants. The chief indications are to (1) promote elimination, (2) quiet the nervous system and (3) preserve the strength of the patient.

To meet the first indication, in sthenic cases, hydragogue cathartics may be used and after the first effects cholagogue cathartics should take their place. In asthenic cases the cholagogue cathartics only should be used. To assist in clearing out the engorged or occluded uriniferous tubules, digitalis has the best reputation; diuretin is also largely used. Diluents, particularly dilute solution of cream of tartar and citrate of magnesia are frequently used.

Hydrotherapy, both external and internal, is of very great value and the satisfaction with its use is increasing constantly. Large quantities are used per orem and high saline enameta are exceedingly beneficial. While the hot pack assist greatly in elimination in all cases, it must, of course, be used more cautiously in the asthenic type, and the same may be said of the electric light bath.

To meet the second indication, i. e., where the nervous symptoms are severe, the prolonged neutral bath is very soothing and beneficial. During uraemic convulsions, chloroform

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may be required for temporary, and morphine for more permanent quieting effect, and which is believed by H. P. Loomis to assist in elimination, and a few authorities favor the use of pilocarpine, but most acknowledge that it must be used with extreme care. Dry cupping frequently yields good results. Thermotherapy is particularly applicable to patients of the sthenic type where the pain is particularly severe.

The third indication, that of preserving the strength of the patient, is looked after first by the *cautious* use of cathartics, using cholagogues rather than hydragogues, and second by careful dietetics. Most authorities insist upon exclusive milk diet, many demanding skimmed milk. Renvers, of Berlin, quoting from the Journal of American Medical Association, May 24, 1902, says: "The diet should contain carbohydrates and fats to supply the needed calories, and limit the albumin to what is actually necessary, not more than 50 or 60 gm. for an adult not at work. An exclusive milk diet is not advisable as it contains albumin. The milk can be diluted with gruels, etc. As the nephritis subsides the milk can be increased to two quarts a day. Even after albuminuria has entirely disappeared, meats should be added only tentatively to the diet. Vegetables and fruits are not permissible unless the diuresis is abundant. The allowable proportion of albumin should be supplied at first in the shape of pure vegetable albumin. In case the blood pressure is low, hot drinks will be found useful, avoiding those containing meat extractives or alcohol. Digitalis and strophanthus are rather injurious than beneficial if administered with normal blood pressure. Hot drinks of sweetened diluted milk or malt extract with cream, and brief hot footbaths are useful measures, but the only real diuretic, he reiterates, is water."

Surgical treatment, not infrequently indicated and used in chronic nephritis, is sometimes indicated in acute parenchymatous nephritis when complete suppression occurs and a fatal result prevented.

Prophylaxis. This is of exceeding importance. All persons of lithaemic tendencies, and indeed all others, should be encouraged to drink an abundance of pure water. With the increasing number of patients with chronic intestinal indigestion,

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we may expect to increase the number of cases of nephritis, which will appear most frequently, no doubt, as a chronic form, but which will pass through a mild form before it becomes chronic.

Case Histories. Clara M., age 12, was convalescing from scarlet fever, desquamation had ceased, urine had been normal throughout the disease, which was not of a severe type; was up and about six weeks after the acute symptoms of scarlet fever, began to complain on Friday with pain in the back but did not remain in bed until Monday, at which time I was called; marked oedema of the eye-lids and of the feet had occurred, appearing in both places within twenty-four hours or just preceding my visit, according to the reports of the family. The urine had been scanty for two days, was very dark color, of high specific gravity at 10.32 with only a trace of albumin on the day of first visit, within the next twenty-four hours only two ounces of urine was secreted, in the next day 1½. Oedema increased, vomiting began and the patient began to be delirious. Under treatment, consisting of purgation by calomel and sulphate of soda with three or four hot packs a day, the urine increased in quantity on the fourth day, nervous symptoms began to quiet down, albumin increased for a few days, but by the end of the fourth week had disappeared entirely, the patient making, so far as could be determined, an uneventful and complete recovery.

Harry J., a business college student, age 22, first noticed marked decrease in amount of urine, to which he paid no attention until about the third day when he began to have fever, but had no chill, skin was hot and had some headache, pulse was of high tension. First twenty-four hours I saw him, he secreted only 3 ounces of urine, which contained 1½% of albumin and epithelial casts in abundance. This young man had had two attacks previously of inflammatory rheumatism. This man was given two electrical light baths, followed by neutral baths daily for three days, and calomel purgation. On the third day of treatment, he secreted 6 ounces of urine, which contained a good deal of blood, and for three or four days following there was some blood, but in constantly diminishing amounts. His improvement was uninterrupted and he was able to go to his home in a neighboring state, though against my advice, at the end of the

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second week. A sample of urine sent me a month later was normal in every particular.

For the following case history I am indebted to Dr. Chas. F. Smith, of Des Moines:

Rex Allen, male, age 7 years, strong, healthy child, no history of any previous illness of any importance. Was taken sick August 18, 1902, with mild form of scarlet fever. Was seen only three or four times during the attack, which ran a very mild course, with no symptoms of any severity. Urine examined following the second visit on August 23, and found to be normal. The case was seen on August 24th and 25th, and was apparently well on the last day. September 7th I was again called and found the child slightly oedematous in lower limbs, suffering from dull heavy headache, refused nourishment, and appeared drowsy all the time. The amount of urine was noticeably decreased until the total amount on September 19th, 20th and 21st, was two ounces and one-half. Very grave symptoms of uraemia had developed, nausea, dull heavy headache had become extreme. His stomach had become so irritable that not even water could be retained. The oedema had become general; the abdomen and thoracic cavities both containing a large amount of fluid, and it looked like death could not be far off. The examinations of three days' specimen of urine referred to above showed .7 of 1% of albumin, numerous red blood corpuscles, epithelial cells and casts. The following day, the symptoms not having improved, the boy was anaesthesized with chloroform and a double necrotomy performed. The time consumed in the operation on both kidneys was 17 minutes. The operation consisted in cutting down, exposing the kidney, removing the kidney fat, splitting the kidney capsule, peeling it away down to the pelvis of the kidney, trimming away a portion of the capsule. The kidneys were then slightly scarified to relieve the intense congested condition. The day following the operation a large amount of bloody urine was passed, containing a great number of red blood corpuscles, epithelial casts and albumin. There was slight increase in the amount of albumin for a few days following the operation, which I can explain only by the greatly increased amount of blood present. After a few days, however, the amount

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gradually decreased until on October 22d the specific gravity was 10.20, the amount of albumin .2 of 1%, neither blood nor casts could be demonstrated in this specimen. The headache, vomiting and oedema had completely disappeared. The patient was feeling perfectly well. Urinalysis made at short intervals showed a gradually decreasing amount of albumin until on December 1st there was not even a trace to be found. Since that date I have seen the patient occasionally and he is apparently in perfect health, there being absolutely no indication of kidney trouble.

In conclusion let me remark that when the profession of medicine in the United States shall have become thoroughly organized, we hope that one of the first committees appointed shall be one on nosology, whose duties shall be to bring order out of chaos now existing, especially in the nomenclature of inquination of the kidneys.

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THE CONTRACTED KIDNEY AND ITS CLINICAL SIGNIFICANCE.

WALTER L. BIERRING, M. D., IOWA CITY, IOWA.

In considering the subject of the contracted kidney I can hardly hope to offer anything that is particularly new, but possibly the study of its clinical significance or relation to the organism as a whole may present a few points of interest.

The term contracted kidney is but the anatomic expression for the condition produced by the development of new fibrous connective tissue, and as such is usually the result of some chronic irritation, more frequently inflammatory.

Under this head I will include the following three forms:

1. Secondary contracted kidney or secondary chronic interstitial nephritis.

2. Primary contracted kidney or primary chronic interstitial nephritis.

3. Arterio-sclerotic kidney or arterio-sclerotic interstitial nephritis.

To this might be properly added a fourth or mixed form, usually a mixture of the chronic interstitial with a chronic tubular nephritis. While the several forms differ considerably in their anatomic appearance, and have a varied etiology, in clinical manifestations and significance they are identical.

I have excluded from this consideration the chronic congested kidney, and the amyloid kidney, both presenting in their later stages a certain amount of induration, yet not sufficient to warrant a classification with the contracted kidney or even as separate, distinct, indurative conditions.

The secondary contracted kidney represents the terminal stage of the chronic tubular or parenchymatous nephritis and thus usually succeeds the large white or large red kidney. As the interstitial changes supervene over the tubular or parenchymatous, the resulting induration leads to a contraction of the organ, but as it follows a condition in which the kidney is enlarged the resulting kidney is not smaller and frequently some-

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what larger than the normally sized organ. The surface is granular in appearance, capsule adherent, cortex denser in consistency and diminished in thickness.

The primary contracted kidney is a chronic interstitial process from the beginning and the consequently contracted organ is frequently but one-third or one-half the size of the normal kidney, with a greatly narrowed cortex of dense leathery consistence and a marked granular surface, for which the term of granular or cirrhotic kidney is very appropriate.

Arterio-sclerosis of the kidney may be representative of the renal type of arterio-sclerosis and thus be the only manifestation of arterial change in the body, or it may be the accompaniment of a general arterio-sclerosis. The contraction that results is explained by the localized arterial anaemias in the cortex, which lead to infarct formation. To replace the defective areas included in the infarctions, new connective tissue is produced which promotes contraction.

The contracted organ is small, often but one-half the size of the normal kidney, but the contractions are irregular, often existing as deep scars, and the uniform granular surface seen in secondary and primary contracted kidney is not present.

Histologically the changes in the three forms are more or less uniform; the fibrosis or interstitial change is manifested by an increase of the fibrous connective tissue about the blood vessels, around the glomeruli, and between the tubules. In the secondary contracted kidney the tubular changes are very marked, while in the primary contracted kidney the interstitial fibrosis predominates, and in the arterio-sclerotic kidney the fibroid change is more or less irregularly distributed to correspond with the anaemic areas.

Essentially the anatomy of the three forms is identical, differing only according to the distribution and mode of production of the new connective tissue; the resulting condition in each instance is an example of contracted kidney or cirrhosis of the kidney.

Etiology. The causation of the three forms of cirrhotic kidney is more or less uniform, and is usually of haematic toxic origin. As the purification of the blood devolves almost entirely

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on the kidney, an abnormal condition of this fluid is liable to produce renal lesions.

Toxic irritation of the kidney is the common cause of all nephritis and these toxic substances may be either of chemical, infectious or metabolic nature.

Where the chronic nephritis or cirrhotic kidney develops as a result of an acute nephritis the condition must be attributed to the same influences prevailing in acute nephritis. Chronic interstitial nephritis or primary contracted kidney is essentially a chronic malady from the first, and the toxic irritant is evidently of gradual and persistent character, of which lead and alcohol are good examples.

In connection with this form of cirrhosis it is the disturbances in nutrition that play an important role, especially such processes as gout, chlorosis, diabetes, the various cachexiae, overwork, chronic skin, hepatic, and intestinal affections. I can not refrain from emphasizing what has been dwelt upon by Elliott, that auto-toxaemia of digestive origin is the most frequent cause. In fact, the early symptoms of chronic nephritis are not infrequently equally characteristic of gastro-intestinal derangement, as the coated tongue, eructations, abdominal discomfort, constipation, pain in the back, exaluria, and excess of indican.

The liver appears to be the vestibule of all toxic and infective agents, alimentary and digestive poisons absorbed from the bowel, and if for any reason its protective action is incomplete, these irritating bodies gain access to the blood and are presented to the kidney in excess.

The causation of an arterio-sclerotic kidney must be the same as that of arterio-sclerosis in general, but associating as we do the process with senescence, chronic infection and intoxication and definite local systemic derangements, the circulating poison can readily be conceived as a cause for both the indurative and degenerative lesions in both blood vessels and interstitial connective tissue of the kidney. The occurrence of arterio-sclerosis in the kidney does not necessarily preclude the presence of arterio-sclerosis elsewhere, as it may be the only example of it in the body.

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Diagnosis and relation to cardio-vascular changes—

With its frequent insidious onset and slow development cirrhosis of the kidney is well styled the 'bete noir" in diagnosis for the clinician.

The dependence of diagnosis clinically relies principally on the changes in the urine and the cardio-vascular changes.

The urine is increased in amount, of low specific gravity; the amount of albumin is usually slight, often no more than a trace, at times more, again absent for days and weeks at a time, may appear cyclio and resemble a functional albuminuria. The sediment consists of a few hyaline casts, rarely a few epithelial and granular forms—as a rule the casts are rather narrow.

As the urinary symptoms are more or less obscure the cardio-vascular changes assume a more important role, in fact they dominate the clinical picture of chronic nephritis or the contracted kidney, and take a commanding position in prognosis and treatment.

The changes in the heart muscle find expression in hypertrophy, primarily of the left ventricle. At times an interstitial myocarditis may be associated with it; valvular lesions are extremely uncommon, except as through dilatation a relative insufficiency may result. The longer the process continues or that a patient lives, a consecutive enlargement of the right ventricle may also occur.

The left ventricle hypertrophy manifests itself by an accentuation of the second aortic sound and increased arterial tension.

The changes in the arteries include primarily a contraction leading to a small pulse, which resists compression and flattening, with a small pulse wave. Later in the process evidences of arterio-sclerosis appear and finally those of atheroma.

The cardiac hypertrophy must be regarded as a conservative process, the result of nature's kindly efforts to overcome peripheral resistance and compensate the renal insufficiency, but it also marks the beginning of a vicious circle of degenerative changes in the cardiac structures, which are widespread and lethal in tendency.

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With but few exceptions thickened arteries and a pulse at high tension may be accepted as cardinal signs of cirrhosed kidneys.

Although the relation of cardiac hypertrophy to renal disease is a thoroughly well established one, the mechanism of its production is by no means clear in spite of the large amount of work that has been done on the subject, especially from the pathologic side.

That it is purely compensatory for renal deficiency is hardly tenable, because it is occasionally absent in granular kidney of high degree, and even when a large amount of kidney substance is destroyed as in hydro-nephrosis and extensive cyst formation, there is no attending cardiac hypertrophy.

Where atheroma of the aorta and sclerosis of peripheral arteries exists, a contracted kidney of arterio-sclerotic origin can reasonably be expected. In a recent article Mix places the greatest reliance in diagnosis on the physical signs manifested by the cardio-vascular system, giving but a minor consideration to the urinary symptoms.

With well marked cardio-vascular and urinary changes the diagnosis is readily made, but since cardiac hypertrophy often appears late and again is absent, when the urinary findings are also at times misleading, especially as to quantity of urine and amount of albumin, it becomes a matter of extreme importance to determine whether the kidneys are seriously affected or not; this being equally important to the surgeon as to the physician.

In fact, it is a matter of greatest clinical significance to know whether the kidneys perform their proper function, and clinicians have long sought after methods to determine the conditions of the renal filter. The renal permeability, as the French writers term it, is tested especially by noticing the interval between the administration of a substance and its reappearance in the urine.

The most noteworthy tests devised for this purpose are the following:

Methylene blue, and rosaniline tests.

Potassium iodide, and salicylate of soda tests.

Phloridzin test.

Cryoscopy.

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Methylene blue and rosaniline are substances that are introduced subcutaneously in definite amounts, usually one cubic centimeter of a one per cent. solution of the stain, which lead to the excretion of a coloring matter in the urine.

Drugs like potassium iodide and salicylate of soda produce more or less pain when injected subcutaneously, and to avoid this very small quantities must be used, which is in itself a drawback to these tests. The elimination by way of the kidneys and easy recognition of the substances in the urine tests the efficiency of the renal filter.

Whenever the elimination of these substances is prolonged beyond the time limit noted under the normal conditions, or the amount excreted diminished, a diminution in renal permeability is recognized.

These substances test principally the filter function, but in the introduction of the new substance phloridzin as a test object, the purpose sought is to gauge the metabolic activity of this organ, inasmuch as the administration of phloridzin causes glycosuria owing to a specific action on the renal cells. This test was introduced by Achard in 1900, and was first administered by the mouth, later subcutaneously. The dose is five milligrams, which is preferably mixed with equal parts of sodium bicarbonate to hold the phloridzin in solution, being injected subcutaneously into the lumbar region. In the healthy kidney sugar appears in the urine in one-half to one hour after the injection, disappearing in the course of two to four hours. The amount of sugar excreted averaging one-half to two grams.

Under diseased conditions the amount of sugar excreted is less than normal, and is not greater during the first half hour than the second half hour, which is the case under normal conditions.

The separation of sugar from phloridzin takes place in the epithelial structure of the glomeruli and the tubules of the renal cortex. and in no other part of the body, so that the test indicates, first, the integrity of the epithelial structure, and second, the degree of permeability of the membranes which interpose between the blood and urine in the renal parenchyma.

Watson and Bailey, of Boston, have recently made very ex-

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tensive applications of this test, and I take from their conclusions that the test gives accurate indications of the condition of renal function and of existence of renal disease, more delicate and discriminating than ordinary urinary tests, but in the large number of observations it has shown itself too variable to be trustworthy and to justify urging its adoption in preference to former methods of urinary analysis for estimating the functional capacity of the kidneys.

In cryoscopy a new means is opened up by which the integrity of kidney structure may be determined. The name refers to the process whereby the freezing point of certain liquids may be compared to that of distilled water, and in the study of the comparative freezing point of blood and urine in an individual, an estimate of kidney function is obtained.

When the freezing point of blood is lower than normal and the freezing point of urine is higher than normal, the condition indicates an insufficiency or impairment of the kidney.

This method is reported principally in foreign journals, but appears to be of greatest value, and if by further work its value received additional corroboration, the surgeon and physician of the future will have means of diagnosis that will be invaluable.

Thus we find that with the best of diagnostic means a case here and there escapes recognition, until forcibly brought to our attention by the diagnosis of the ophthalmologist of an albuminuric neuro-retinitis or an uraemia amaurosis, or the sudden onset of a hemiplagia, or a uraemia with its disastrous chain of consequences.

Clinical significance. While we look for the cirrhotic kidney in later life the conditions adaptable for its development can exist at an earlier age.

The secondary contracted kidney more closely connected with prolonged infections or toxic irritants is liable to development in early life.

Age is no criterion for the existence of arterio-sclerosis; it has been observed by Bergnitz in a child of 18 months, Young in a child 15 months of age, and Seitz, among 148 autopsies of arterio-sclerotic subjects, found seventeen cases ranging from 10 to 29 years of age.

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The contracted kidney represents a definite form of diseased kidney, and as such probably exists after middle life more frequently than is generally suspected. When present it probably has a greater influence on the general health than any other disease condition.

In fact, if I were to gauge an individual's power of resistance to the various influences that disturb the normal equilibrium, it would be by the condition of the kidneys; to the trite saying that the criterion of a man's age is the state of his arteries, I would prefer to add that a man is as old as his kidneys.

The successful outcome of many a surgical operation, often of the simplest nature, depends upon the proper eliminating power of the kidney, and the post-operative uraemia is often the first indication of a contracted kidney.

Among the various infections, septicaemic or bacteraemic in character, we stand practically helpless if the channels of elimination fail, and especially the kidneys. It modifies the course of every pneumonia with general pneumococcus septicaemia and in streptococcus infection the prognosis is invariably bad if a renal insufficiency exists.

What might be an ordinary gastro-intestinal indigestion in one person, in another with a cirrhosis of the kidney, disturbance in hepatic function would result, the blood become overloaded with auto-toxins and because of the renal insufficiency a uraemia must necessarily result.

Discussion on the Papers of Drs. Stevens and Bierring.

DR. W. B. LA FORCE, of Ottumwa.—*Mr. President:* I think we are to be congratulated on the choice of our chairman in selecting for such a symposium this interesting subject on the various lesions of the kidney, and, as spoken of by several of the authors, it calls forth the greatest acumen of the physician to diagnose not only the existence, but the nature, of a kidney lesion. I think the last speaker did well in referring to the mixed form, the fourth form of nephritis, in which we have the different varieties, the interstitial, the acute desquamative, and the other varieties mentioned, all mixed together, so that in any

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given case we have more or less difficulty in determining exactly the nature and extent of the lesion. There is nothing stated in any of the papers to which I would take exception, but I would emphasize the points that have been brought out, and refer to the difficulty existing in determining apparent lesions which exist in some of the severe gastro-intestinal disturbances. Given a case of intestinal indigestion, or of intestinal toxemia, and its probable effect on the kidney, it is impossible to determine whether there is inflammation or degeneration of the kidney, and, of course, that requires very careful testing of both the urine and the determination of cardio-vascular changes. As to the diagnosis of the existence of the cardio-vascular changes, there has been discovered and brought to the attention of the profession within the last few years an important instrument (the tonometer) for determining the degree of vascular pressure which exists. This instrument has been used very largely and experimentally on the lower animals, and the results of those experiments have been recorded, yet it has not been put to practical use by the profession until within recent years. While we are considering the various methods of diagnosis and the interesting points referred to by the last speaker in determining the function of the kidney, the various substances used in determining the action of the kidney, I cannot help but feel the great loss to ourselves when we go home if we do not adopt the suggestions which we have heard here. We are not living up to our knowledge. We learn various methods or means of diagnosis; some are exact and helpful, while others we disregard. I think sometimes we are careless and we do not make sufficiently thorough examinations to arrive at proper and exact diagnosis. Every physician ought to have a little laboratory of his own, especially for diagnostic purposes. It does not require very much in one particular line; but in all of the different lines we have a number of means which are neglected, and we lose the great value of our Society by not adopting and carrying out suggestions which are advanced at these meetings in the papers that are presented.

The point of age as determining the probability of existence of arterio-sclerosis is very interesting. The existence of arterio-

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sclerosis in comparatively young people, such as was mentioned by the essayist, should be borne in mind. We are all prone to overlook the existence of arterio-sclerosis in the young. "A man is as old as his kidneys," is a trite saying, as Dr. Bierring has said, and from that we should learn that in any severe disease, such as pneumonia, or infectious disease, we must keep track of the kidneys. We must not only ask the nurse if the patient is excreting urine in normal amount, but we must find out its color, etc. We should make thorough chemical and microscopical tests to counteract possibly any condition which may occur and which has been brought to your notice by some particular symptom or symptoms which have manifested themselves. We should be on the lookout for it, and make investigations of the urine.

The case of appendicitis, with functional albuminuria, referred to by the first essayist, is very interesting. If I understood him correctly, functional albuminuria existed for several weeks prior to the operation for appendicitis, which was followed by prompt recovery, showing that there was a functional disease. The point in conection with this is that he made repeated quantitative tests. He determined that the disease was not progressive, and that qualitative tests were carried out systematically in addition to the quantitative.

There was one statement made by Dr. Stevens which I may have misunderstood, and if so, I would like to be corrected, and that was with regard to the nature of inflammations of the kidney. He stated that probably cases of beginning parenchymatous nephritis were acute, but that we could not have a primary interstitial nephritis.

As regards the surgical treatment in cases of interstitial nephritis, I have observation of two cases where there was marked benefit derived from operative intervention. It was a question whether the arterio-sclerosis was secondary, or whether it was a sclerotic kidney, and the severe inflammation having been produced by pregnancy. Of course, we know that pregnancy, as a cause of nephritis, has a very favorable prognosis, and these two cases that were operated on had nephritis which was caused by pregnancy. There was in both cases a neuro-retinitis which accompanies degeneration of the retina, resulting

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in more or less amaurosis or blindness. The results were favorable in these two cases. The prognosis in cases of nephritis associated with pregnancy is usually favorable.

I appreciate the papers that have been read very much, and while there are other points I would like to speak of, I do not care to consume any further time.

DR. C. F. WAHRER, of Fort Madison.—These papers and the discussions on them take me back to the first time I attended a medical society. You never saw a man more mixed up in his life than I was that day. I heard a paper on a given disease, its etiology, and methods of diagnosis discussed, then some suggestions as to treatment. Now, you all agree with me that the aim of all our investigations regarding any disease must be eventually treatment. A school of medicine which is now the most prevalent (the German school) is mostly interested in diagnosis. When the diagnosis is clearly established, the patient can go to thunder for all they care, and I believe it is a very helpful innovation, if I may use that word for want of a better one, because in diagnosis we are so lamentably lame. We all know it is absolutely essential to make a correct diagnosis. Therapeusis is comparatively easy in curable diseases, but extremely difficult in incurable ones I have been wondering this afternoon, after hearing these excellent papers, giving the different forms and classifications of kidney affections, whether the main thing we want to get at is not the treatment. One of the essayists suggested that in the treatment we should use digitalis, but he did not state how we should use it. He did not presume in an audience like this to tell us how, but I want to say to you that digitalis is one of the most abused drugs we have in the pharmacopeia. It is a drug that is the least understood by the better practitioners. It is a two-edged sword which works for good and which works for death. I was told, when I was a young man, by an old practitioner, that he gave his patients digitalis and never saw any harm from it; that given in increasing doses it is not a poison; that it does not accumulate in the system. Digitalis is a powerful remedy, and it makes a decided difference in what form it is used, whether in the form of digitalin, digitoxin, digitonin, or digitin, etc. In some of these forms the drug is inert.

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I want to say to you, that it makes a vast difference in renal diseases in what form you give digitalis, and in what quantity you administer it, whether it be the tincture or fluid form, or in the form of an infusion. It is a question whether you can drive an already feeble, overworked heart to force this drug through an impermeable set of kidneys and tubules, such as you saw this afternoon in the Kaiserling specimen, and whether it is the proper thing to use to whip up the already tired out heart to force it through these impermeable tubules, as you would like to do. I do not wish to be understood as reflecting upon the intelligence of a single person here; but in your study of the use of digitalis, more than perhaps any other agent, you will find some wonderful revelations. It is a remedy that is capable of doing an immense amount of harm, but it can be made to do a great deal of good.

DR. M. BANNISTER, of Ottumwa.—I desire to refer to one or two things in connection with these interesting papers. We are eating meats that are practically put up with a great deal of saltpetre. The German government prohibits putting of saltpetre in meats, and the time is coming when this State Medical Society ought to take some action on the preservatives used in canning foods and vegetables. We should strive to have the same restrictions placed on the use of preservatives of foods for our own market in this country as the German government does. I am satisfied that some of the meats on the market cause as much kidney trouble as sedentary habits.

DR. J. H. ROBINSON, of Sioux City.—I did not get here in time to hear all of the first paper, but what I did hear was very good and commendable. These are valuable contributions to this subject, and they are worthy of more extensive and thorough discussion than we can give them today.

With reference to the treatment, I would like to say one thing, that in treating acute parenchymatous nephritis we ought to keep in mind a knowledge of the pathology of the condition, and always remember that the skin should be taken care of and looked after, as well as the bowels, so that elimination may be carried on by the skin and to some extent by the lungs. Furthermore, very often I find patients are not kept sufficiently warm.

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I wish to speak of the diuretic effect of normal salt solution given by way of the colon, after the bowels have been thoroughly emptied. Normal salt solution acts nicely as a diuretic, and I believe it surpasses digitalis in these cases.

There is another point I would like to mention, and it is this: Too often, after the treatment of a case of acute parenchymatous nephritis, the patient is turned loose, wearing cotton underwear instead of woolen underwear. This predisposes to a sudden attack which may develop into a chronic one and leads to large kidney.

DR. WALTER C. FRASER, of Corwith.—There is one point that I did not hear mentioned in any of the papers, namely, to determine what the kidney is doing. In examining for the quantity of urea excreted, one should get a twenty-four hour specimen, as this is one of the typical means of determining the activity of the kidney. It is a method we should use not only in determining the activity of a diseased kidney itself, but prior to operations. Not infrequently physicians go ahead and do an operation, and after the operation is completed there is a secondary uraemia, which might have been avoided by examining the urine previous to operative intervention.

With reference to the use of digitalis, in kidney affections we frequently have high arterial tension, and when tension is high and digitalis is used, it is detrimental to the patient. Probably a milder diuretic would be more efficient in these cases. In determining the quantity of urea excreted in twenty-four hours, it would be well also to know what the skin is doing as well as the bowel, and whether or not the patient has been on morphine for any length of time before making the determination. I recall one case I had to operate on where the urea was about half of what it should be. We made an examination. The patient had been on morphine probably for a week before I saw him. On discontinuing the use of morphine and making an examination a day or two afterwards, the urea came up to normal. An operation was done subsequently, without any ill effects.

DR. WALTER E. SCOTT, of Adel.—In the consideration of uraemia, we should not forget that it is not due to retention of urea exclusively, but that there are many other factors entering

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into it which belong to the auto-toxins in affections of the kidney. There are other conditions of the system more important than the treatment of the kidney itself. This is especially true in cases of acute parenchymatous nephritis, for the reason that we have an inflammatory process of the kidney just as we have inflammatory processes in any other part of the body due to the same cause, perhaps infection, and the determination of the blood to other parts of the body, the skin, especially liver and abdominal organs, will relieve the kidney and do more good than the application of any remedy administered to the kidney itself. It seems to me, that we give but little heed in our kidney affections to this point. I am firmly convinced that in many cases of kidney degeneration treatment should be directed to the gastro-intestinal tract; that there is the origin of the difficulty, and treatment should be applied to it. In other words, attention should be given to the diet and to the gastro-intestinal tract. It may be a simple thing to say, but I believe you can do more toward eliminating from the system the toxins which produce the symptoms of uraemia and other intoxications that are present in kidney troubles by giving calomel and remedies applied to the liver than you can in any other way. As Dr. Bierring said, the kidney is the reservoir for all toxins formed in the system. The action of our remedies should be such, in these cases, as to reduce at once the formation of toxins, and thereby cause their elimination from the system, thereby getting beneficial results.

Dr. Clifton Scott, of Des Moines.—There are one or two points in these papers I want to refer to again, and one of them is that we may discover more or less albumin in the urine in cases of cystitis, and yet the kidney may not be at fault. In my early professional experience, I recall the case of a practitioner, advanced in years, who was addicted to alcohol, and began to have albumin in the urine in connection with cystitis. I could find no evidence of pus by the use of the microscope, but the quantity of albumin, according to the ordinary tests, was quite large. I supposed that the man had advanced kidney disease. I talked with him for quite a while about it. I treated the cystitis; he drank as much whiskey as he wanted to, and lived a long time afterwards.

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Another point that has been made is with reference to the percentage of urea. I recall the case of an old gentleman who came to me one time troubled with an asthmatic cough; he could not sleep well at night. On taking the quantity of urea in twenty-four hours, I found it was about half of what should be excreted. The specific gravity was about 1008. I expected to find albumin, but never could find casts. The percentage was 1-3000. With that small amount the kidney was demonstrated to be largely at fault.

DR. T. J. MAXWELL, of Keokuk.—This discussion is very interesting, and the subject should be thoroughly discussed. Bouchard, a Frenchman, who has written a work on auto-intoxication, gives a simple method of testing the amount of solids that are eliminated by the kidneys in twenty-four hours, and that is, by taking the number of ounces of urine secreted and multiplying the number of ounces by the lowest figures of the specific gravity, and then adding 1-10, you get the number of solids eliminated in twenty-four hours.

The great trouble with these kidney affections is the want of a laboratory and the proper instruments to determine the exact conditions which exist. This test is simple, and can be used at any time. The kidney is a great sewer through which and by which all effete matter of the system is eliminated. We have other emunctories, but they are unlike that of the kidney.

DR. STEVENS (closing the discussion on his part).—In answer to Dr. La Force's question as to whether I intended to make the statement that in all inflammations of the kidney the blood vessels are affected first, I will say that I meant to say that, except, of course, inflammations that occur from an infection of the bladder or of the blood vessels in that way. It is a difficult matter to conceive how the interstitial tissue can become diseased without, at least, the individual being affected by the histological elements, principally the intima being affected by the active poison which produces later serious histologic changes.

Relative to the use of digitalis, we did not go into that phase of the subject. Personally, I prefer to use a fresh infusion of digitalis, as prepared by druggists I know, and give it in sufficient doses until I get the desirable effects. I would give small

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doses, frequently repeated, giving the drug until I obtain the physiological effects.

I think the Society, Mr. President, is under obligations to the reader of the last paper for the advanced questions presented.

DR. BIERRING (closing the discussion.)—I appreciate what was said regarding the necessity of paying more attention to treatment. I also appreciate what was said by the same gentleman (Dr. Wahrer) in reference to diagnosis. We are living in a time of diagnostic age; we are undergoing the gradual change that is beneficial. It seems to me, that when the diagnosis is clear and the significance of the condition and general condition is plain, therapy will soon be applied.

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NEPHROLITHIASIS.

C. A. CHURCHILL, FORT DODGE.

By nephrolithiasis is meant a pathological condition characterized by the formation of concretions of various sizes in the kidney substance, renal pelvis or calyces. The concretions are formed by the precipitation and deposit of certain solid urinary constituents usually held in solution.

The concretions vary in size, from fine sand to kernel of wheat, pea or walnut size, and even, as recorded in one case, to the enormous size of one weighing five pounds. When large they are usually single but small concretions are often multiple. They may be round smooth bodies, but their surfaces are usually rough or mammilated and when filling the pelvis or calyces of the kidney they are usually rough, branched or coral shaped. As regards chemical composition they are found to consist of uric acid, oxalate of lime, carbonate of lime, phosphate of lime, a mixture of phosphate and ammonia-magnesium phosphate (the fusible calculus), cystine, xanthine, urate of ammonium or the mixed urates, and in frequency are found about in order named.

Alternating calculi are not uncommon, consisting of distinct layers of uric acid, oxalate of lime, or phosphate of lime.

The color differs with the chemical composition. Uric acid being reddish yellow, oxalate of lime purplish brown, and the phosphates grayish white. The color varies in the different layers in alternating calculi. Exceptional specimens may be yellow, pink, green or blue.

Etiology. Nephrolithiasis occurs at all ages, including intra-uterine life, but it is most common before fifteen and after fifty years of age. Uric acid calculi are more common in children, while the phosphate of lime variety predominates after the fortieth year.

It is generally conceded by authorities that men are more subject to this disease than women, though this has not been the experience with some.

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Defect in general metabolism is an important element in the etiology and is especially evidenced in the uric acid state and gout. Excessive meat diet and a sedentary life tend to the production of this state and are therefore causal factors. It is probable that some substance must act as a nucleus around which a calculus forms. Mucus, blood clots, albumin, epithelial cells and masses of bacteria may be the starting point of concretion, the normal salts of the urine being deposited around these bodies. An abnormal condition of the brine, however, probably renders it possible for deposits to take place. A low percentage of salines and deficiency in coloring matter in a highly acid urine seems to favor the precipation of uric acid and the formation of uric acid stone, while an alkaline urine and an excess of phosphates are favorable to the formation of phosphatic stone. Then an excess of the sparingly soluble elements, such as cystine or xanthine, may be precipitated though the urine be otherwise normal.

Locality, for some unknown cause, seems to be prolific of renal calculi. There are certain localities in England called the "Stone Counties," and some parts of Scotland and the Delta of the Nile are noted for the peculiar frequency with which the inhabitants are affected with renal calculi.

Heredity seems to be an important etiological factor. It is as marked as the hereditary taint of rheumatism and gout, and probably its transmission is due to the same peculiar diathesis.

Pathology. The disease is usually unilateral, occurring in both kidneys in about 15%. The presence of a calculus may exist in a kidney for some time without producing any recognizable symptoms, but sooner or later pathological conditions will result. The primary lesions are simple inflammation of the pelvis of the kidney with turbid urine, irritation and inflammation of the ureter, bladder, and sometimes the urethra, due to the passage of renal sand or gravel.

The secondary lesions are chronic pyelitis, pyelo-nephritis and perinephric abscess, atrophy of the kidney or a thinning of its substance and dilatation. Hydronephrosis may be a sequel due to the plugging up of the ureter by a calculus or closure of the tube by intra-ureteric inflammation, or pressure necrosis may cause rupture of the ureter. Splenic and hepatic enlargement

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may be found with prolonged suppurative pyelo-nephritis. Then a renal calculus may take up its abode in the bladder, increase in size by accretion, producing a cystic stone.

Symptoms. The symptoms may be divided into those of the acute and chronic stages. The acute symptoms are usually ushered in by the passage of a small calculus through the ureter, producing renal colic. The paroxysms of pain are exceedingly severe, commencing in the region of the kidney affected and following the course of the ureter down to the bladder. The pain often extends into the thigh and sometimes down to the foot. During these severe paroxysms, convulsions and syncope may occur. Micturition is frequent and painful. Retraction of the testicle on the side affected nearly always occurs. Dr. Montaigne, centuries ago, graphically described the symptoms of a severe attack of renal colic in his own case. It has never been described in a better way and I quote what he said, "Thou art seen to sweat with pain, to look pale and red, to tremble, to vomit well nigh to blood, to suffer strange contortions and convulsions, by starts to let tears drop from thine eyes, to urine thick, black and frightful water, or to have it suppressed by some sharp and craggy stone, that cruelly pricks and tears thee." These symptoms persist until the calculus has passed into the bladder, and varies in time from an hour to days. There may be chills and a temperature of 103 Fahrenheit, but usually the fever is slight or none. After the passage of the calculus into the bladder, pain in the back and abdominal tenderness on the affected side may persist for several days.

Chronic Symptoms. There is usually pain and soreness in the back. Sometimes the pain comes on in paroxysms and is severe, but usually it is of a dull character. Passing of renal sand is another symptom of the chronic stage, and this may produce irritation of the ureters and sometimes cystitis. Haematuria occurs frequently but is not as a rule profuse. It may persist for a long time and is aggravated by exertion. It may disappear for days or even weeks and return after sudden exertion or jolting.

Later in its course pyogenic germs enter into the pathology of the disease and determine the development of suppurative changes in and around the kidney. Severe pain in the back,

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amounting to colic, with chills and high temperature, followed by profuse sweating, together with smoky or bloody urine containing abundant epithelium, are the prominent symptoms of chronic pyelitis. These symptoms will recur at intervals of weeks or months, for years, and the subject be in otherwise fair or robust health. Therefore the mistake in diagnosing these cases as malaria is frequently made. Pyuria is not always present, but when pus is found in the urine it materially aids in the diagnosis. When perinephric abscesses form the general health begins to show the ravages of the disease in the way of general sepsis, together with the symptoms of pyelitis. Atrophy of the affected kidney is the rule but it is not infrequent to find the kidney distended to a mere sac and its function destroyed.

As the destruction of the diseased kidney progresses the opposite kidney becomes hypertrophied.

Diagnosis. Usually the first symptoms to which the physician's attention is called is an attack of renal colic, though the patient may consult his physician for a smarting and burning of the urethra after urinating, and irritation of the bladder and frequent desire to urinate, which is due to renal sand or even microscopical uric acid crystals. Such an array of symptoms ought to put the physician on his guard, for this is the most fortunate time to recognize the condition of his patient. The urine should be examined, both chemically and microscopically, at frequent intervals in order to determine the renal condition. If the urine is highly acid and a large number of uric acid crystals are found in the urine, the probability is that he has to deal with a uric acid nephrolithiasis. On the other hand, if the urine is alkaline and is not due to ammoniacal urine, caused by retention or cystic stone, and there are abundant phosphates, the phosphatic nephrolithiasis may be expected. Thus the reaction of the urine and the kind of crystals found may determine the kind of calculi present. The oxalate of lime stones usually cause the sharpest pain and the most hemorrhage. Tenderness is usually found on pressure over the loin and over the region of the kidney in front. The X-ray has been successfully employed to diagnose the larger calculi found in the kidney, but cannot be relied upon for the diagnosis of renal sand or smaller concretions.

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The finding of a calculus passed in the urine after a renal colic renders the diagnosis positive. Attacks of dyspepsia and severe headaches are not uncommon with those affected with nephrolithiasis.

Differential Diagnosis. The diagnosis of nephrolithiasis must be differentiated from tuberculosis of the kidney, malignant disease, biliary colic and malaria. The greatest difficulty is encountered in making a differential diagnosis between early tuberculosis of the kidney and nephrolithiasis. Frequent micturition and slightly purulent urine, without history of haematuria, in an individual of strumous habit points to tuberculosis of the kidney, but if there is haematuria, lumbar pains, tender and retracted testicle, there is probably stone in the kidney. In malignant disease the hemorrhage is more profuse, and not made worse by exertion or jolting or accompanied by paroxysms of pain. Pain and hemorrhage are relieved by rest in nephrolithiasis, while in malignant disease hemorrhage may be profuse during absolute rest. When anuria exists, if it appears suddenly it favors the diagnosis of renal calculus obstructing the ureter. Even though only one kidney is affected, suppression of the urine not infrequently occurs.

Swelling in the loin may be present both in malignant disease and renal calculus, but if there is an antecedent history pointing to a calculus diathesis, before swelling begins, kidney stone is probable.

The diagnosis between biliary colic and renal colic is sometimes difficult when the right kidney is affected. In biliary colic the pain is in the upper half of the abdomen and jaundice appears in about 50% of the cases. Retraction, pain and tenderness in the testicle, the character of the urine, frequent and painful micturition, and especially haematuria, assists in making the diagnosis of the kidney stone. In severe malarial poisoning haematuria occurs and the recurrent attacks of backache, chills and fever, of chronic nephrolithiasis simulate malaria, but the backache of malaria is not confined to one side as is usually the case in kidney stone. The other characteristics of the urine are also different.

Prognosis. The prognosis of nephrolithiasis should be

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guarded. Patients, it is true, have recurrent attacks of renal colic for years and, with the exception of the colic, remain in robust health. A large calculus may remain in the pelvis of the kidney for a long time without discomfort, but the sword of Damocles is hanging over them, for pyelitis and its sequella are a constant danger.

Treatment. The treatment is divided into medical and surgical, the latter of which does not come under the discussion of this paper. The medical treatment may be mentioned under two divisions, that for the acute attacks of renal colic and that for the general condition and chronic stage. Paroxysms of renal colic call for prompt relief by hypodermic injections of morphine and atropine, together with hot applications applied to the loin. In severe cases it is sometimes necessary to resort to inhalations of chloroform. The sufferer should be required to drink large quantities of hot lemonade, plain or carbonated water or glycerine and water, to promote the passage of the stone.

In the treatment employed, between the attacks, diet constitutes an important part and should be regulated in a similar manner as in cases of chronic gout or rheumatism. Red meats and alcohol should be prohibited. Moderate exercise in the open air, sufficient to use up all the nitrogenous food, and reduction of obesity if the patient is of that habit, is necessary. Large and definite quantities of distilled alkaline or mineral water should be drunk daily. A prolonged sojourn at some of the mineral springs will no doubt do good. The Buffalo Lithia springs of Virginia are probably the best in this country. Londonderry, Otterburn, Saratoga, Bedford, Carlsbad, and Vichy are to be recommended. It is extremely doubtful whether stones formed in the kidney and too large to be passed through the ureter ever become dissolved, notwithstanding some of the claims made for certain drugs and mineral springs. Lithium citrate or carbonate in five grain doses, taken several times daily, seem to have an eroding effect on the uric acid stones and may prevent the formation of new deposits.

Sodium phosphate and potassium acetate, citrate and tartrate are useful. These drugs should be taken with large quantities of water. Recently piperazin, lycetol and urotropine have

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been used by some for solvents of uric acid stone, and undoubted benefit has been attributed to their use.

Von Noorden advocates the continuous use of calcium salts in the treatment of uric acid calculi, and Croftan, of Chicago, has carried out the treatment in this country with apparent benefit. They favor the calcium carbonate or the natural mineral water containing the salts of calcium. Croftan advocates the use of large quantities of pure water to which has been added ordinary lime water. Modus operandi of this drug, as explained by these men, is somewhat far fetched, but the results show the possible correctness of their view.

If the calculi are thought to be the phosphatic or oxalate of lime varieties and the urine is alkaline and phosphates abundant an attempt should be made to keep the urine in an acid condition. This is more difficult than to render the urine alkaline when its reaction is acid. Saccharin in three grain doses, benzoic and boric acid in fifteen grain doses several times daily, are the most satisfactory methods of accomplishing this result. When there is pyelitis or pyuria, urotropine or cystogen in five grain doses three or four times daily will, no doubt, retard the suppurative changes. However, when there is a large stone lodged in the pelvis or calyces of the kidney, and is producing disturbances or when suppurative changes have taken place, the case should be turned over to the surgeon.

Discussion on the Paper of Dr. Churchill.

DR. D. C. BROCKMAN, of Ottumwa.—*Mr. President:* The Society is to be congratulated on having listened to a series of papers on the most important subject of kidney disease. While this is not the subject under discussion, I simply want to mention it in connection with the importance of diagnosis. I have frequently reiterated before this and other societies in speaking of the importance of diagnosis that the difference between a good doctor and a poor one is that one makes a diagnosis before death and the other after death. The important thing in disease of the kidney is to make an early diagnosis. If a man comes to you with a pain in his back, if you do not make a correct diagnosis,

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you are doing wrong in prescribing for him until you have made a diagnosis. This is particularly true in calculus disease of the kidney, and yet it is an affection that is more often overlooked or called by some other name than the diseases which have classical symptoms and descriptions.

Day before yesterday I saw a man who had been sick for four or five months with a severe pain in his side. He was treated for neuralgia, for lumbago, and recently for gall stones. He had been treated for the last five or six weeks by a competent physician for gall stones, although the tenderness and pain were always on the left side. He presented a typical picture of stone in the left kidney. He had severe paroxysms of pain, the pain radiating down the ureter, settling severely in the left testicle, causing retraction of the organ, with very marked irritation of the bladder during pain. The pain could only be relieved by large doses of morphine, followed by bloody urine and irritable bladder for several days, with tenderness along the course of the ureter and up to the kidney. I never saw a more typical picture of kidney stone than that man presented; yet he had a plaster on his right side over the gall bladder of about thirty or forty square inches.

Yesterday a man came to my office from out of town with a history of having been treated for six months for disease of the left lobe of the liver, yet he presented a typical picture. When I examined the urine yesterday, I found large quantities of blood in it, casts and clots. That poor fellow had been treated for months for trouble with the left lobe of the liver by a competent physician. What does all this mean? It is simply carelessness. It is carelessness to call it neuralgia or something else when you do not really know what is the matter with the patient. The trouble is that too frequently we make snap diagnoses without analyzing our cases as we should do. No pain in the back should be prescribed for until a urinary analysis, both chemical and microscopical, has been made, and no microscopical examination can be made without the use of the centrifuge. It is not necessary to have a large laboratory to do this. With very few instruments it can be done in a few minutes, and should be done in every case before we prescribe for a case of pain in the back.

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There is one point I want to refer to which was not touched upon by the able essayist, and that was the matter of calculi passing down the ureter and lodging in the ureter. Several times in the last few years I have seen cases where the patients complained of severe pain from obstruction of the ureter by a stone, which was lodged in a sacculated place in the ureter and acted as a ball-valve. When the patient moves around after lying down, he would have always a severe pain, starting at one point, and by pressure over that point one could elicit pain. We had here a ball-valve action of the stone in a dilated ureter.

These cases are surgical, not medical. The importance of the use of the X-ray in these cases has been overlooked by the general practitioner; yet this means is not accurate in the hands of many of the manipulators of the X-ray. An expert in the use of the X-ray may be able to make an accurate diagnosis with the aid of skiagraphs and only by them, because the fluoroscope is of no value whatever. A patient came to me some four weeks ago saying that she had a stone as large as a hen's egg; that the physician who had attended her had seen a stone by means of the fluoroscope. She had no stone in the kidney at all. You cannot see a stone in the kidney with a fluoroscope unless it is a peculiarly formed stone. If it is a uric acid or phosphatic stone, you cannot see it with the fluoroscope. Only the most expert manipulator of the X-ray can make a diagnosis of urinary calculi by this means. But in almost all of these cases we have a clinical picture which is so classical that no one ought to make a mistake in an ordinary case of urinary calculus.

DR. J. P. CRAWFORD, of Davenport.—The diagnosis of these conditions of the kidney is very uncertain. It is rarely possible to demonstrate the presence of a stone in the kidney by physical examination, and many other means of diagnosis have been found to be very misleading even in the hands of experts. It was my privilege to see the late Dr. Fenger, not long before his death, cut down upon a kidney where he felt justified by the symptoms in finding a stone, and after repeated puncture he backed out and sewed up the wound, with negative results. I think it is Jacobson who, in his operative surgery, cites a case operated on by an eminent English surgeon. In this case the

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symptoms pointed to the presence of a stone in the kidney which justified nephrolithotomy. He went in and was unable to verify the diagnosis by manipulating the kidney, which he brought out into the external world, manipulating it between his thumb and fingers. He punctured it, and after having injured it so much he decided to enucleate it. After the kidney was out on the table and pressing it, he was unable to find the stone, but after dividing the kidney in two a stone was found of nearly the size of the average marble, thoroughly embedded in the kidney tissue, and surrounded by a deposit.

A boring pain, especially in the right kidney, may be very easily mistaken for some of the symptoms common to gall bladder disease. Dr. Brockman has mentioned cases where there is an absence of jaundice and obstructive symptoms. Haematuria is not a positive sign of the presence of stone in the pelvis of the kidney, for we may have a hemorrhage due to mechanical irritation, due to inflammatory or ulcerative changes in any part of the urinary tract. Perhaps the most positive symptom, or that which is relied upon more especially, is the phenomenon, or train of symptoms, which follows in the transit of a stone from the kidney down through the ureter into the bladder, and the most significant symptom in this phenomenon, as mentioned, is that of pain, with strangury. Pain about the testicle and thigh and the glands. It is only a short time ago that I had a case of appendicitis in which the most persistent and constant symptom was that of pain about the testicle and bladder. Operation the next day showed it to be a simple and uncomplicated case of appendicitis. On the other hand, I recall a case which presented the ordinary symptoms of appendicitis, where an operation was done, the appendix was found normal, but by a little deeper exploration a mass was found about the region where the ureter crosses the pelvis, and there was found a stone which had passed down from the kidney evidently, and had been stopped by the isthmus about the pelvis, and was in the reservoir, which was removed, with complete relief to the patient, showing we may have the characteristic symptoms of appendicitis, which are common in many troubles.

The most significant case which showed the different steps

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from the kidney down to the bladder is illustrated by one which came to me three months ago. A man, thirty-five years of age, came to me with a history dating back five years. He said at the beginning he had a paroxysm of some kind, which was not very painful, but it was attended with a great deal of depression and considerable collapse. Following this he voided a large amount of urine. There was a great deal of irritation of the bladder and kidneys. This man went along for two or three years with occasional pain about the region of the left kidney, which was doubtless a pyelitis due to the retention of this stone in the ureter. Later on he developed symptoms which were more like those of vesical trouble. He had ammoniacal urine, residual urine, symptoms of cystitis, but occasionally he would have pain about the kidney, and for the last year or two not much of that. This man was examined by some of the most expert genito-urinary surgeons in this country, particularly those in Kansas City and Chicago, with negative results, although the symptoms were characteristic of stone in the bladder or about the ureter. He came to me some time in December. I searched his bladder, as others had done, with negative results, still he had all the symptoms of stone in the bladder. A skiagraph revealed the presence of a stone, which was an inch and one-eighth in diameter, in the region of the kidney. It was difficult to determine whether it was behind the bladder in the ureter, or encysted in the bladder or fold. It eluded frequent search by the searcher, and the ordinary means. This man submitted to an operation, which I made in the latter part of December. I made a suprapubic incision, passed my finger into the bladder, found a smooth wall throughout, but no stone. I had my assistant insert his fingers well up into the rectum under the bladder, and with great effort raised the bladder, and there I came in contact with a portion of the bladder area, which was more firm than that of the other. I could not outline it. It was about two inches to the left of the median line. By this constant pressure from below, bringing it up from below, I reached over to the left ureter, which I found somewhat patulous, but not larger than a lead pencil, and after insinuating the end of my finger and dilating, I was able to get in far enough to come in contact with the

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stone, which made it conclusive the condition we were confronted with. To remove the stone was another question. I kept on dilating and dilating, gradually making more and more progress, and in the course of an hour I was able to grasp the stone with stone forceps and deliver it. The bladder was then washed out, and treated in the usual way.

I merely report this case to show the uncertainty of diagnosis of location of the stone.

DR. CHURCHILL (closing the discussion).—I have nothing in particular to say in my closing remarks. There is one point, however, I would like to mention, and that is, in cases where there is obstruction of one of the ureters it might be determined by the segregator, finding out if there is one kidney which is not functionating, on account of such obstruction. Some of these cases are exceedingly difficult to diagnose. I recall a case I had three years ago, in which I could not make a diagnosis correctly. I could not make anything out of the case but malaria, and treated the patient as such. He was not getting any better, but gradually becoming worse. I induced him to go to Chicago. He did so, and Dr. M. L. Harris, after examining him carefully, made a diagnosis of malignant disease of the right kidney. He died about six weeks afterwards, and post-mortem verified the correctness of the diagnosis.

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HEART AFFECTIONS AND THEIR RELATION TO THE RESPIRATORY SYSTEM.

A. J. BURGE, M. D., IOWA CITY, IOWA.

The whole history of medicine, in its march from the realms of mysticism toward the ranks of exact science, reads as romance, and no part of the story quite so strange and fascinating as that clustering about the heart. The old half mystic, half poetic idea taught by Hippocrates, that the heart could do no wrong, and could not be diseased, is surpassed in strangeness only by the fact that this belief remained universal until the seventeenth century, when, based upon the earlier discovery of the circulation by Harvey, Galen, Vieussens, Valsalva, and others, began to associate certain general pathologic conditions, as dropsy. ascites, and dyspnoea with malfunction of the heart. From this beginning, the labors of such men as Laennec, Stokes, Skoda, DaCosta, Leyden, Bomberger, Cohneim, Romberg, and others, through research and experiment have given us a knowledge of the heart which makes that master diagnostician, Traube, say: "In no other category of disease does physical examination conduce so much to a correct diagnosis. Our findings of functional and anatomical changes here form a basis from which we can reason the consequences with almost mathematical certainty."

What a man looks for he finds. If we look for heart alterations, we find them here, there, and everywhere throughout the disease, and we come to believe what that master teacher, Kavocs, of Vienna, was wont to repeat to us: "The heart, gentlemen, the heart, is the mainstay of health, and the center of disease."

It is to a limited part of this one field that I would ask your attention today—the heart in its relation to the respiratory system.

Physical life and activity rests upon oxidation—a process of combustion.

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For this there must be fuel, but more, there must be oxygen in which to burn it; burned to make bodily heat and energy; burned to make bone and muscle; burned in the brain to make thought. For this fuel, which the blood in its ceaseless round of circulation carries and stores up, the lungs must furnish the oxygen that is to keep lighted the eternal altar fires of life in every individual cell, and thus is the one dependent upon the other, and upon the united work of both must life itself depend.

In this work are two circulations: (1) The pulmonary or short circulation, (2) the arterial, or general. Each, with characteristics peculiar to itself, has a heart. These two hearts, to all intents and purposes, might well be located in different parts of the body, so different is their work and function.

Although nature has drawn them together in one envelope, they are still separated by an inpenetrable fibrous wall, and each carries on its separate work, bearing its own burdens, and overcomes, or falls victim to its own obstacles; and if they ever do affect each other, it is only mechanically through their circulations, and never by contiguity. Therefore, we shall speak of them as the right and the left hearts.

A comparison of the two and their work, in health, shows us how they may differ in disease. The *left* heart with its heavy muscled walls drives its blood under high pressure through a system of long, narrow arteries and capillaries, kept firm and elastic by a perfect nervous mechanism, the vaso-motor system, increasing pressure here, releasing it there; raising it to meet exertion, lowering it in rest and sleep. The thin walled *right* heart forces its blood under low pressure through short arteries, branching infinitely into capillaries of wide calibre, whose walls are mere membranes, to allow the free interchange of gases; and, *without* vaso-motor control, they stretch and dilate with each varying force behind or resistance in front, and its valveless veins conserve no force, therefore, its burden is, as it were, a dead load.

If a part of the left circulation is cut off, say the crural artery, the vaso-motor center releases pressure in another part and the tension is promptly equalized. The pulmonary circulation, on the other hand, works within certain comparatively rigid limits; it has a certain relatively fixed capacity, holding about

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one-tenth of the entire blood of the body at a given instant, and through its combined calibre all the blood must flow which flows through the entire general circulation. Now, if a part of its calibre or capacity is cut off the remainder must do the entire work and the blood must be sent through its channels correspondingly faster and under increased pressure, which means, at once, increased work for the right heart.

Again, the left circulation works in and among tissues of its own temperature, at a given constant pressure and density, while the surroundings of the right circulation vary, as the air we breathe, in temperature, moisture, density, purity, and what not. It is evident, then, how delicate is the work of the right heart even in health; and, in the strain of disease, how apparently predisposed it is to unbalanced influences within and without.

Furthermore, the lungs exert a constant influence on both hearts and their functions through purely physical or mechanical laws. We know that being carried up in altitude, as in balloons or mountains, quickens the heart and pales the lip. Valsalva in the seventeenth century showed by experiment, that by extreme inspiration, closing the glottis, and a prolonged strong expiratory effort, the surface vessels are congested and the circulation practically stopped because blood is pressed out of the heart and more can not enter. Muller in 1838 showed, conversely, that by deepest expiration and closing of the glottis and a prolonged attempt at inspiratory movement, the heart and lungs are engorged with blood and the surface is depleted. We all know that by severing great veins, as the jugular or axillary, air may be sucked into the heart during inspiration as to cause death, and we have all watched the intensity of a bleeding artery ebb and flow with the respiration. In general, then, we say inspiration favors diastole of the heart and expiration favors systole.

Likewise, the function of the lungs depends much upon the immediate state of the circulation in them. Internal respiration, or the interchange of gases, depends immediately upon certain factors: Is (1) the amount of blood in the capillaries, (2) the pressure of the current; (3) its velocity. Any material change in either of these is readily transferred to the general circulation and there likewise interferes with the proper oxygenation of the

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tissues and organs of the body, with malnutrition and consequent anemia following, which in turn react upon the heart and lungs, lessening their own tissue nourishment and rendering them still less able to meet the overwork already demanded.

Of course, in order to properly perform its work of forcing blood out, the ventricles must be properly filled. This depends, on the one hand, upon their own integrity, and, on the other, upon at least three factors: (1) the sucking action of the ventricle itself, (2) the balance of force remaining from contraction of the opposite ventricle, (3) more important than either of the others, the pumping action of the thorax in its alternating pressure, or partial vacuum, varying with each cycle of breathing, inducing the inflow of blood.

In our busy practice, I believe, we are prone to think of heart disease, only, or primarily, at least, in relation to the left heart and its circulation alone, which, it is true, does make up the great part of heart affections. There is, however, a great class in which the right heart is foremost, and it is with this heart especially that this paper would deal, and from two general points of view: (1) the involvement of the heart as a *result* of lung affection, (2) the heart as a *cause* or a *factor in producing* lung disease.

Scientific methods in medicine have, in the last few years, established the relationship and intimate connection of certain diseases of these two systems.

An example of this is the association of rheumatic affections, through the throat, with endocarditis, nor is it rare to find the throat affection the only precursor of a serious heart involvement.

A glance at hospital statistics will show this sequence in heart disease in one or more of its several forms, affecting either endo, peri, or myocardium. Romberg, in his Leipsic clinic found in 670 cases of endocarditis 75 per cent. of all directly traceable to infectious diseases, 58 per cent. following articulat rheumatism, with or without throat complications, smaller percentages following rheumatic throat troubles alone;—diphtheria, of the upper air passages, and pneumonia and pleurisy, of the lower tract.

Pericarditis was even more closely associated with rheumatic

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throat and pleuritic affections, to pneumonia, and to another factor—tuberculosis.

Billings (J. A. M. A., Dec. 7, 1901) reports personal observations in a number of cases of pericarditis secondary to tuberculosis affections, to pleurisy, and pneumonia.

The myocardium has long since been known to be a source of danger in certain diseases of the respiratory tract, either by direct infection or by their toxins, especially of diphtheria of the upper tract and pneumonia of the lower, and recently tuberculosis has also been added to this list.

Anders (J. A. M. A., Nov. 1, 1902) carefully reports a case of tuberculosis of the myocardium in which the primary focus was a small caseous area in either lung, and further collects seventy-two reported cases of myocardial involvement, either as large tubercles, the miliary form, or a diffuse infiltration following tuberculosis in one part or other of the respiratory tract, the infections in these cases believed to occur by way of the bronchial and mediastinal lymph glands and their channels.

Another line of heart involvement as a result of lung disease is that of a purely physical or mechanical effect. Traube first described what has long since become axiomatic—the tendency to hypertrophy and incompetency of the right heart in lung troubles. We saw how normal breathing favors the short circulation, and upon this help the thin walled ventricle leans. To the extent that perfectly free lung activity is interfered with to that extent is this help lost and the right heart overworked.

The determining effect of this resistance on the right heart is controlled by certain factors. For instance, tuberculosis affections within the lung substance, as retractions and consolidations do not, as a rule, result in hypertrophy, because the vitality of the system is below par and the heart cannot respond to the demand; so we say, firstly, the nutritive or building up power of the system is a determining factor. Another factor is the time allowed in which to respond. The thin-walled right heart cannot hypertrophy as fast nor as much as the left, so in an acute onset, as in pneumonia, it dilates, while if more chronic it hypertrophies. As a third factor, the amount of resistance offered naturally controls the extent of reaction. A good ex-

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ample of this with almost inevitable results is kyphoscoliosis. Here the deformity compresses the lungs and prevents free expansion and so offers a double resistance to the short circulation. Romberg reports out of thirty-eight autopsies of adult kyphoscolitics, twenty-eight, or 75 per cent. had right heart affection, dying at an average age of 45 years.

Another most potent cause, and yet oftenest overlooked is emphysema; potent, because here the condition of over distension of the alveola thinning the walls and obstructing the capillary network surrounding them, the increased air pressure, together with a limited movement of the thorax, and lowered vacuum, all work together to resist the naturally low pressure of the pulmonary circulation; overlooked partly because of the extreme difficulty of definite heart percussion or auscultation, covered as it is with distended lungs and their noisy, wheezy breathing, partly because we often fail to look for it, being prone to attribute the whole trouble to the lung itself.

Another fruitful cause of right heart trouble is lung retraction. As noted above, the cutting off of a part of the combined tubal capacity, increases the rapidity of flow and tension of the remainder. Furthermore, in such cases we have as a rule a compensatory emphysema in the remaining portions of the lung which causes still further resistance and the strain of results which invariably follow. Likewise, solidification—as in pneumonia, either acute, or especially the chronic interstitial form; occlusion—as in infarcts of the lungs, or partial conclusion, as in severe bronchitis with swollen lining membrane and heavy secretions. Compression, as in pleural exudates and pneumothorax, all furnish examples of a like nature with similar results upon the integrity of the right heart.

Another condition now recognized, less common but highly interesting from the present point of view, is the condition of partial or complete obliteration of the pleural spaces, with or without effusion. The patient apparently recovers from his illness, the percussion note becomes clear and resonant once more, the breathing vesicular, and, when at rest, he has little or no discomfort, but, upon slight exertion, as a walk, or climbing a stairway, he finds himself short of breath, with lips blue, heart pal-

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pitating, and a feeling of general exhaustion. All this makes us feel that there is something serious remaining that is not accounted for by recent lung changes alone. A closer examination shows that the borders of the lungs are immovable in respiration, and that the thorax walls make little or no excursion in breathing; that is, the rib-breathing is practically eliminated. This gives the key to the trouble—the loss of the two helps we named at first, preventing the proper filling of the ventricles with blood, which in turn lessens the current of blood passing through the lungs, giving us two symptoms, dyspnoea and cyanosis, which, as we shall consider later, are highly diagnostic of heart incompetency.

Our second view point is—the predisposition to respiratory disease in heart patients.

As to the left heart alone, its various affections, be what they may, insufficiency or stenoses of either the mitral or aortic valves, or muscular hypertrophy or dilatation, the effect on the lungs is practically the same—purely mechanical, a damming back of the blood by impeding the emptying of the pulmonary veins into the left auricle, and a resulting passive congestion and the secondary results of hypertrophy, dilatation or incompetency of the right heart.

This, however, takes us into another class and to our main topic—the right heart, how and to what extent does it cause or predispose to disease of the respiratory tract?

As a basis, we find certain results following right-sided affections which become factors of disease in the air tract. The commonest lesions—those of hypertrophy or dilatation, or both, usually secondary to pathological conditions in the left heart, or in the thorax and lungs, as previously described, cause (1) a damming back of the blood, or *congestion*, (2) a *slowing down* of the normal current. In passing, let us for a moment consider the results of these several factors.

These two causes are not actively serious; perhaps their greatest effect is the dyspnoea or air-hunger on exertion, causing discomfort to the patient and limiting his working capacity. Again, they predispose to the long list of throat and bronchial catarrhal troubles, coughs, bronchitis, and even broncho-pneu-

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monia. Also in over excretion of mucous or serous sputum in which we are apt to find streaks of blood or blood-cells, also "herzeehlerzellena"—round single nucleated epithelial-like cells, pigmented with iron from the broken down blood corpuscles.

As to farther reaching effects, it is the concensus of opinion, so far as we can learn, that the factors thus far *do not* predispose to infections, in fact, it is claimed that they even protect from tuberculosis. It is when a third factor is added to congestion and slowing of the current, that matters become serious, that is the *weakening* of the blood *pressure* in the right circulation; this, of course, occurring in myasthenic conditions of the right heart, either idiopathic, or in an incompetency, as in the secondary affections mentioned. It is now that the function of internal respiration is interfered with and dyspnoea, even at rest, occurs; that the capillaries become distended, tortuous, and sacculated; the entire tissue blood-soaked, as it were, with tendencies to transudation and pulmonary effusion into the alveoli, often with rapidly fatal results.

This factor added, undoubtedly predisposes the lungs to those infectious diseases whose portal of entry is the respiratory tract. The serous exudates offer a good culture medium, and the lowered vitality a poor resistance; and the heart, overburdened as it already is, and working under strain, soon succumbs when put to the fiery test of disease.

As a secondary result of these factors named, we have, naturally, an impediment to the emptying of the great veins of the general circulation with passive congestion of the viscera, especially of the liver; chronic poeural effusions; hydro-thorax, and kindred conditions; oxanosis of the peripheral circulation, and, since a diminished supply of blood is furnished the left ventricle, a soft arterial pulse of low tension. In disease of the right heart we have a possibility of each or all of these contingencies ever present.

However, it is not to the extreme cases of these classes—as congenital abnormalities, blue cyanotic children, nor old heart sufferers, ordeniatous, cyanotic, and dyspnoeic, signs which he who runs may read, and in persons who, for the great part, are beyond help—that I would ask your time and attention; but, for

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that greater army of those who have lesser lesions which perhaps the patients themselves do not realize, and which only most faithful examination and observation on the part of the physician will disclose during health, but which sweep down upon us like wild-fire in the storm of intercurrent disease. It is such cases where diagnosis is worthy of its name and meaning—"to know through"—enabling us to foresee and forewarn, that merit our most careful attention and study.

An actual case will perhaps illustrate my point better. A physician of middle age, active habits and strong physique, is stricken with pneumonia, which soon completely involves the middle and lower right lobes, here, in addition to the solidification of a large part of the lung substance, the remainder is under the pressure of compensatory emphysema, both conditions heavily resisting the heart. The crisis comes and is safely passed; friends and attendants regard him as out of danger, and recovery but a matter of time. But we have carefully watched the second pulmonary sound. It has been bounding and accentuated, bespeaking the high tension and effort in the right circulation. Suddenly we note that it is not so loud and ringing as before, the right heart impulse is weaker and a soft purring murmur under the sternum suddenly develops, which tells us of a break in the heart muscle strength, dilatation and incompetency, or the possibility of a clot forming in the right heart and vessels. Then, in the midst of buoyant hopes, pulmonary oedema—before which we are powerless, fills the lungs and the man is dead.

Who among us has not had similar experiences, not only in pneumonia, but in diphtheria, typhoid, and other high or exhaustive fevers, with the system charged with toxins, when on the face of apparent recovery and a good prognosis we suddenly find the patient collapsed, pinched, dyspnoeic, and cyanotic, or a sudden unexpected death prostrates the family, and, unless we have most carefully watched for these things, catches the phyiscian unguardedly; and the question comes to each—with different significance: What might have been?

There is a topic, recently come into more prominence, which it seems to me, is so akin to our present subject that I beg to give it for illustration. I refer to congenital hypoplasia of the

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vascular system, a condition in which the entire vascular system is undeveloped in size, lumen, and integrity. The patients may seem apparently normal, often there is a tendency to fatness, but they are below par in resistance, to exertion, or disease—to which they usually succumb suddenly and unexplainably, until the condition appears in embalming or in the autopsy. A friend (Dr. Burke of Buffalo) in the Neusser Clinic of Vienna, collected from medical literature reports of autopsies or 208 such cases. It has been my misfortune to have known four, all young adults, apparently in the full strength and health of young life. Three of these cases were stricken with diphtheria, before whose ravages antitoxin seemed powerless, for with its administration and most careful hospital attention, each succumbed about the fourth day to right heart failure and pulmonary oedema. Were the condition to be diagnosed at all the proper time, obviously, was at the very beginning of, or before the infection, and the practical part would have been to have most carefully warned and guarded these patients from all infections, as far as possible.

As our final topic—What are our aids to diagnosis in disease of the right heart? It is a far different problem from that of the left heart. Purely physical examination gives us little and unreliable information as compared with the left; we cannot feel its pulse, with all its data, which give such invaluable help, in the left circulation; we cannot inspect its field of work as we do that of the left heart. If we do establish increase of dullness to the right, is it not misplacement of an hypertrophied left heart? *It* the right, is it hypertrophy or dilatation? Is it a filling from active compensation or a passive dilatation with insufficient contraction? Finally, is it organic, relative, or functional? Is it primary or secondary?

Of course, there are physical signs which helps us, one or more of which may be present:

(1). *Dilatation* usually gives us extension to the right on percussion, especially if the right auricle is also involved.

(2). *Hypertrophy* often gives us a heaving, diffuse pulsation under or near the sternum. It may also increase the apex beat, for we remember that the apex is formed by the right ventricle, differentiated from left hypertrophy, however, by the

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sound being reflected to the right instead of to the left as usual.

(3). The accentuation of the second pulmonary sound—a reliable sign in increased tension.

(4). Murmurs, of course, have their value. If they are *variable* in their presence and character, they are especially indicative of dilatation from myocardial weakness.

(5). The positive systolic venous pulse of the external jugular.

(6). In incompetency, a small, soft, arterial pulse, due to passive obstruction, as mentioned above.

But these physical signs are not our only guides, nor the best ones, to malfunctioning of the right heart. More reliable are its *functional* signs:

(1). Chief among these is dyspnoea. This may exist in any grade from slight shortness of breath on exertion, up to a condition where the slightest pressure on the thorax or diaphragm, as, a full meal, lying down, where the abdominal viscera oppose slightly the movement of the diaphragm, or even sitting with the feet elevated on a chair, the ever favorite position with heart patients, is intolerable.

(2). General cyanosis is our next guide, and this is *differential.* Dyspnoea occurs as a result of our *first two* factors of disease, *congestion* and *slowing* of the stream, as in compensated obstructive lesions; *cyanosis*, as a result of the third, *lowering* of the pressure; and occurring alone, it indicates involvement of the *right heart* only, while dyspnoea and cyanosis indicate all three factors, as where both sides of the heart are involved.

(3). Pulmonary oedema, as revealed by auscultation and percussion of the lungs, would, of course, verify our diagnosis of right heart failure or incompetency.

(4). Other symptoms, as cardiac cough, cardiac asthma, and angina pectoris, while highly suggestive and helpful to diagnosis of heart disease in general, would *not* be differential.

An interesting case of this class showing what a heart may sustain, and still functionate, and keep glowing the spark of life, was an old lady under my observation for a long time, from whom I was able to obtain this specimen, not in the best of condition but illustrating excellently some of the points we have

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considered. She presented to a striking degree the symptoms of dyspnoea, cyanosis and oedemas, as may well be imagined from the fact that she had not slept in a reclining position for over four years.

You will note here the immense hypertrophy of the left heart, apparently competent to the last; the right heart, on the other hand, is dilated almost beyond recognition, and thinned in places to a mere transparent parchment. Furthermore, it contained a large antemortem, well organized, fibrinous clot, partially filling the right ventricle and extending out into the auricle and the pulmonary artery, a part of which is still to be seen in the specimen.

We have spoken of some of the things which make for correct and early diagnosis. Of treatment—I shall not presume to speak before this assembly of elders, many grown gray in the practice of medicine, but rather would I close with a question.

In view of these things which we have been able to but touch upon, is it not possible that beyond microbic agents, still more far-reaching, lie causes which make infection possible? Why is it we so often see an apparently strong member of a family stricken down, and weaker ones left, who have been equally exposed? Why does pulmonary tuberculosis invariably assail the right apex? Because here is the point of poorest circulation, and therefore of weakest resistance. That it gains a foothold *at all*, may not the right heart often be wholly responsible? Are there not among the patients of each of us certain individuals who, by this predisposition, are fore-doomed, if they once fall victim to a severe infection? Can we as physicians over-estimate the far-reaching effects of such inherent weaknesses and tendencies, the thorough recognition of which makes us more able to guide them through the storm of disease, and, greater still, to *guard* them *from disease* which, after all, is the highest altruism of the practice of medicine.

Discussion on the Paper of Dr. Burge.

Dr. James R. Guthrie, of Dubuque.—*Mr. President:* I wish to compliment the writer of this paper for two reasons:

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First, because it displays the fact that he has consumed some time and study in its preparation; it indicates clearly that he has given great attention to details; second, because I feel that this paper brings to our attention an intensely practical topic, a topic that meets us every day of our active practice, and almost at every turn of our professional careers.

The title of his paper, "Heart Affections and Their Relation to the Respiratory System," teaches us an important lesson that we are too apt to forget, that is, the correlation which exists between the different organs of the body. We are too apt to neglect the well-known physiological fact that all the organs of the body have this correlation, and to utilize those facts in practice is one step toward the establishment of a more rational method of diagnosis and also of treatment of disease. Throughout the paper there ran distinctly a line which reminds you of something you have heard before, a truism in medicine, that the study of normal action must always precede a rational idea of pathology, and that is one of the strong points, as I take it, in the paper that has just been presented—to know abnormality we must understand the normal, and that feature has been well emphasized throughout this excellent paper.

Again, another fact which was emphasized years ago in the medical journals and in the text books was with reference to the strength of the organism, the constitution of the patient. Too much emphasis was placed upon that feature, perhaps; but the modern idea has gone equally far to the other extreme, and too little attention is devoted to the study of the family and personal history of the patient. This paper brings out clearly that important fact. The central lesson, if I understand the paper aright, or the most important conclusion that he forces home upon us, is the expression of the philosopher who exclaimed, "More light! More light!" And this paper throughout, from beginning to end, emphasizes the great importance of entering into detail, and the great need in all of our cases of securing more exactness and more detail regarding the case, first of all, and after it making a rational diagnosis, the diagnosis being based primarily upon physiological knowledge, and it followed up

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and ably seconded by a thorough knowledge of pathological conditions.

DR. WALTER L. BIERRING, of Iowa City.—I cannot refrain from calling attention to the excellent points brought out in this paper, and one is directing attention again to the fact that there are two circulations in the lungs, a point hitherto unrecognized, until called to our attention some three years ago, especially with reference to pneumonia. In pneumonia, for instance, one circulation of the lungs is functional and the other nutritive; one may be involved alone, or both may be implicated, and a great deal depends upon the stability of both of them. We may have the functional circulation completely destroyed, and if the nutritive circulation is kept up, the outcome of the case is usually good. This applies equally well to many infections of the lungs. Recently I saw a case in which a diagnosis of severe acute rheumatic infection was made. There was great hyperpyrexia, the patient having a temperature of 107°, and presented all the evidences of an intense septicaemia. Pure cultures of staphylococci were obtained from the circulation. The individual died of septicaemia, which originated from an ordinary sore throat. In the examination made after death, it was noticed that the arteries were very small, especially those injected by the undertaker or embalmer. I attributed the diminished resistance in this case, in a young lady, to unusually good parentage, and, physically, to this peculiar hyperplasia. It was called forcibly to my attention by a professional friend of mine, a pathologist, who has noticed in many cases of acute infection that died during adult life this hyperplasia, which is so prominent, and he has attributed it to a marked influence predisposing towards a fatal issue whenever acute infection develops.

DR. C. F. WAHRER, of Fort Madison.—I want to say in connection with this paper, that while most of the cases of the type mentioned are largely due to lowered vitality, yet careful and cautious treatment will yield wonderful results.

DR. BURGE (closing the discussion).—I wish to thank Dr. Guthrie for elucidating some of the points that I tried to make clear. It should be our aim to recognize these conditions before the hyperplasia develops to any great extent, and we should be prompt in instituting treatment in these cases before such a severe infection as pneumonia develops, which we are powerless to help.

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SOUNDS OF THE BODY, HOW OBSERVED AND IMPORTANCE OF DIAGNOSIS.

WALTER E. SCOTT, M. D., ADEL, IOWA.

When I agreed to furnish a paper for this section on the subject of "Sounds of the Body, How Observed and Importance in Diagnosis," I fully believed that I would have ample time to complete the investigations I was then making and to put them down in "black and white." On account of sickness in my own family and an unusual amount in those of my regular clientele, the work has been only partially and imperfectly done. A country practitioner, however, by remembering the laws of the conservation of energy, may do some original work even though his time appears to be fully occupied.

In a recent editorial in the Journal of the American Medical Association, I find the following, explanatory of this point: "The busy man is apt to think that he should be exempt from the obligation of trying to extend the bounds of medical knowledge. His occupation he may claim, is a practical application of the discoveries of others. Active practice absorbs so much energy and time as to leave none for anything beyond his patients and their immediate needs, and certainly no opportunity for original work. It used to be the excuse of the medical college professor that he had to devote so much time to teaching and practice that he could not be expected to do any investigating. Now it is recognized that only he can teach well who is himself doing original work.

"Only the physician who so carefully examines his cases that he sometimes makes observations not to be found in the text books, is doing his patients justice and keeping himself up to date. It is the men who thus impress their personality on medicine, that receive the highest rewards in the profession, the confidence of their fellow practitioners and frequently calls in consultation.

"Most of the great advances in medicine have come not from ambitious theorists, but from the carefully recorded observations

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of the general practitioner. Morgagni, from Virchow, greeted as the father of Modern Pathology, was first of all a clinical observer, a careful student of the cases that came under his observation.

"His pathologic studies were always directed to the better understanding of his clinical cases, and that is what makes *his* great work of such practical value. Auenbrugger, the discoverer of percussion in the investigation of thoracic disease, was a simple practitioner of medicine all his life. While Auenbrugger was doing his great work in Austria, Jenner was preparing for his in England. Jenner was just a country practitioner, but, in spite of all the 'laissez aller' that term is supposed to imply, he was one of the keenest of observers.

"When he told the famous John Hunter of the popular belief in Gloucestershire that cowpow protected against smallpox, and that the subject seemed worth thinking about, Hunter blurted out, 'Don't think, investigate.'"

With this apology, we come to our subject, "Sounds of the Body," etc.

Ordinarily in health man is not conscious of many sounds occurring in his own body. A healthy man *ordinarily* does not hear his own heart beats or respiration, or the movements of his intestines, or any other sounds ordinarily produced by the life processes. It seems to be an intended plan of nature that the great number and variety of sounds produced in our bodies are not carried to our hearing apparatus nor cognizance taken of them by the brain; in other words, the processes of life and movements within the body are almost noiseless to the individual himself.

It is only after careful consideration of the subject that the individual will credit the fact of the extent and variety of the sounds produced within his own body by the various movements and processes of life and which *ordinarily* do not reach the hearing center. The vibrations occurring in his body that *do* reach his middle ear mostly escape through the external auditory canal and are lost, but closing the external auditory canals by plugs of rubber or other suitable material confines and reflects these vibrations, and he now begins to hear and take cognizance of

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many sounds not usually heard, e. g., those produced by the movements of the tongue and the act of swallowing, air passing through the naso-pharyngeal space, also the heart sounds and those of respiration surge prominently into consciousness, while the friction of the teeth against each other becomes a very distressing noise.

Impaction of cerumen in both external auditory meatl gives rise to the same phenomena and most of you are no doubt familiar with the almost insane condition, at times, of patients suffering with this disorder; being overwhelmed with the confusion of noises reaching the brain. A similar but exaggerated condition may be produced by plugging the ears completely and attempting to eat a meal, in which case the sounds become almost unbearable

"In health the air in the middle ear is in direct contact with the external atmosphere through the Eustachian tube when it is open, but it is usually closed, except during the act of swallowing; but the normal healthy tympanic membrane is no barrier to the escape of vibrations into the external air, which occur in the middle ear. The conditions are almost the same in this regard as if no membrane existed and the middle ear communicated directly with the external air. In disease, however, when the membrane is thickened and tied down by bands of adhesion, and especially if the Eustachian tube is permanently closed, the middle ear becomes a resonance chamber for sounds produced in the body and from which the individual cannot escape. One victim put a music box under his pillow to avoid the noises which kept him awake.

"As physicians and surgeons, however, it is by mediate or immediate auscultation that the various sounds of the body both in health and disease are observed. Mediate as in the use of the stethoscope and immediate as in the application of the ear.

"By auscultating the body we hear the *great variety* of *sounds* produced in the chest by respiration and the heart's action, both in health and disease. The movements of the stomach and intestines, the splashing of fluids, friction sounds, etc., etc.; but in addition to these we may hear an almost omnipresent sound over the greater extent of the body, viz: *the sound produced by*

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muscular contraction. The principal object of this paper is to call attention to this particular sound, known as the 'muscle tone' or 'muscular murmur,' its recognition and its importance in diagnosis.

"Whenever a muscle contracts naturally in the body, the contraction is accompanied by vibrations occurring 19 5-10 times per second. The tone so produced cannot be heard by most persons; but what is actually heard is the first overtone corresponding 36 to 40 vibrations per second.

"The tone given by an artificially stimulated muscle corresponds to the number of stimuli received per second, showing that there is a vibration of the muscle for each stimulus. In a single twitch or spasm there is but a single vibration of the muscle and no sound is produced, and as the muscles contracting naturally in the body *do* give a sound, they must be in a condition of vibration due to a series of stimuli, in other words, they are in a condition of tetanic contraction."—Reference Hand Book of Medical Science.

When a muscle is stimulated by induction shocks the tone varies with the number of shocks. In the voluntary muscles of man, the muscle tone is always the same tone and therefore caused by the same number of stimuli, regardless of the thickness or the length of the muscles, in other words, a similarity of tone occurs throughout. This being true, when we learn to recognize it, we need never be misled by its presence; and the part it plays in the sounds heard during auscultation can be readily appreciated. Applying the ear or the stethoscope over the muscle of an extremity while it is in a state of rest does not give rise to any sound whatever, but bring the muscle into a state of contraction while the ear or instrument remains in position, a roaring sound is at once heard, varying in intensity depending upon the muscle examined.

During May and June of 1898, I conducted some experiments with a rubber bulb attached to a rubber tube, the tube having an ear piece to apply to the ear. I found that a roaring sound was present whenever the finger or hand was held with some pressure against the bulb or tube. I found that this roaring sound was the same as that produced by closing the external

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auditory canal tightly by the pressure of the finger or the palm of the hand.

I had often noticed, as no doubt every one has, the roaring produced by closing the ear with the finger, and I sought now by experiment to determine its cause. I had read that this phenomenon was caused by the circulation of the blood, also that it was the same sound as that found in a shell applied to the ear. I found that the roaring in the bulb was not present when my hand was laid passively on it and held in close contact by a book or other weight laid on my hand. I found also, when I lay my head on my hand, palm against the ear, and allowed simply the force of gravity to hold the weight of my head against my hand, that the roaring sound was absent. I found also that closing the ear with a plug of wood or hard rubber, did not produce the noise referred to and closing both ears tightly with plugs did not interfere with the hearing to the extent that I expected it would, and the effect of this latter procedure is altogether different from that produced by closing the ears by the pressure of the fingers or the hand, in which case the roaring sound interferes with all other sounds.

The fact proven that the roaring was only present when the hands or fingers were held in contact with the ear by the force of muscular contraction and in such a way as to close it air tight, led me to believe that this roaring sound was produced by the contraction of muscular tissue occurring rapidly enough to cause a tone and that this sound was conveyed through the bones of the arm, hand and fingers to the column of air lying between the tympanic membrane and the finger or hand closing the external auditory canal.

In a similar way by the contact of fingers and thumb is produced the roaring sound so omnipresent in the ordinary stethoscope, (that the roaring in the stethoscope is caused by the muscle tone, conveyed by the contact of the fingers and thumb in applying the instrument, was discoverd by the writer in May, 1898, and recorded in the Austin Flint Medical Journal).

As muscular tissue constitutes 40 to 45% of the entire body weight, and as the contraction of muscular tissue always produces a muscle tone, and as the muscle tone may be conveyed

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by the bones to which the muscles attach, to distant parts; the almost universal presence of this sound during auscultation may well be imagined; and the elimination of it becomes very important. There are several ways by which it may reach the hearing apparatus of the observer, which it will be well to consider in order to know how best to eliminate it; first, from the observer himself, by a drooping or awkward position of the head and body during immediate auscultation; second, by the contact of the fingers and thumb of the observer with the ordinary stethoscope in mediate auscultation; third, by a constrained position of the patient, e. g., arms over the head, arms over the back of a chair, leaning position, in fact a contracted position of any of the muscles attached to the ribs; fourth, nervous and spasmodic patients who cannot relax their muscles.

Elimination of this troublesome sound may be secured as follows: First, the observer himself must be in an easy comfortable position to prevent the sound of the contraction of the muscles of his own body being carried to his middle ear, reenforced by the closure of the auditory canals and carried to his brain. Second, the stethoscope should be applied without the contact of the fingers, or else a non-roaring instrument used. Third, the patient should have the muscles of the arms, neck and chest relaxed. Fourth, nervous and spasmodic patients should be examined while resting in a horizontal position with the muscles relaxed.

The prevalence of this sound in the body, the type of which is shown by closing the external auditory canal with the finger, makes its elimination one of the most important features in auscultating any part of the human body. If the body is resting in a horizontal position and all the muscles at rest no muscle-sound will be observed, except those produced by the muscles used in respiration, and they may be eliminated, at least partially, by having the patient cease breathing for a few seconds at the end of respiration. In listening to the heart sounds this procedure is quite important, giving the most distinct sounds of the action of this organ.

While making these observations I was called in consultation by a fellow practitioner in a case of tetanus. On placing

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the stethoscope over the abdomen while the patient was resting in a horizontal position, a sound was conveyed to my ears resembling the rumbling of an approaching railroad train, and placing the stethoscope over the muscular tissues of the back and neck as well as the extremities, gave rise to the same sound, but the sound was not prominent in the lower extremities.

I saw a horse a short time ago suffering from tetanus, placing the stethoscope against the animal a *very* pronounced muscle tone was observed, and applying it to a horse in the adjoining stall over the same localities did not elicit this sound.

The muscle sound in the horse seems to be induced by the same number of stimuli and vibrations as in man, but this has not been accurately determined.

It being true that the contraction of the muscles invariably produce this sound, and the ease with which it may be observed makes it important also in the diagnosis of any affection in which the muscles are concerned. I believe that by this means we may observe the beginning of tetanus before it has manifested itself in any other way; and other diseases, such a meningitis, tetany, strychnia poisoning, muscular contractures, etc., may the more easily be diagnosed and differentiated by the aid of this muscle sign. Also by its absence muscular degeneration, paralysis, muscular deficiency and muscular atrophy, etc., may be better understood and more easily diagnosed.

My investigations lead me to conclude, also, that a large proportion of the vesicular respiratory murmur is due to the sound of muscular contraction of the respiratory muscles. When we remember the large number of muscles used in respiration, especially inspiration, and that the chest must necessarily vibrate from this cause, we surmise at once that this tone is heard during auscultation of the chest and therefore is a prominent part of the vesicular mumur. The word murmur alone causes us to suspicion that this is true. When we have familiarized ourselves with the muscle tone or muscular murmur by applying the fingers to the ear or applying the stethoscope over a contracted muscle, we may auscultate the chest and recognize at once this sound as a part of the vesicular murmur. By having the patient stop at the half-way point in inspiration or, perhaps better, at the

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end of inspiration, in which cases the air in the lungs is stationary, the muscle sound *alone* is heard and its part in the vesicular respiratory sound is readily appreciated.

No allusion to the muscle sound is found in any article I have read on this subject.

A year ago at Saratoga, I listened with much interest to Dr. Hoover's paper on "The Origin of the Vesicular Respiratory Sound," but no mention was made by him as to the possibility of the muscle tone entering into the vesicular murmur, and the fact of the existence of a muscle tone was utterly ignored in his paper as in all of the articles I have read treating of auscultation of the human body.

I quote the following from Dr. Hoover's paper: "Vesicular respiration gives a confused mingling of sounds which suggest a multiplicity of points of origin. The expiratory sound is much shorter in duration than in bronchial breathing. However remote and faint bronchial breathing may be, the duration of the expiratory sound remains the same, whereas in vesicular breathing the expiratory sound is relatively short, whatever may be its intensity or proximity."

Dr. Hoover relates a case which he says offers absolute proof of vesicular breathing having an origin different from bronchial breathing. The case was that of an old man suffering from hiccough for four to six hours each day for fourteen days, when he died. The glottis being closed and a violent inspiratory effort with contraction of the diaphragm eliminated entirely bronchial breathing, and yet the vesicular murmur was present over apex as well as bases of the lungs, and the duration of the sound during relaxation of the diaphragm sustained the same relative duration to the sound during phrenic contraction which the expiratory sound sustains to the inspiratory sound during normal respiration. He further says, "The observation offers absolute proof of the existence of a true vesicular respiratory sound." He says, "Whether the sound is due to the disturbance of equilibrium of the lung tissue or to the motion of the contained air, or both, is not determined, and I see no possible method of differentiating between these two factors." He says, "All the muscles employed in inspiration were brought violently

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into action. The volume of the thorax was increased with each spasm of the respiratory muscle by rarifying the air contained in the respiratory tract and still the typical murmur of vesicular breathing was audible."

While relating this he makes no mention whatever of the muscle sound. The muscle sound will explain every point mentioned in Dr. Hoover's paper and undoubtedly is the correct interpretation of it. The violence of the respiratory effort and the prominence of the vesicular sound without ingress or egress of air, the short duration of the expiratory vesicular breathing as compared with the inspiratory sound is easily explained on this ground as follows: In inspiration muscular action is very marked. The diaphragm and other muscles of respiration enlarge the thorax against atmospheric pressure by raising the weight of the ribs, sternum, muscles, etc., and compressing the abdominal contents, thereby expanding the lungs; while in expiration the elasticity of the ribs, sternum, muscles and lungs with return of the diaphragm to its normal condition does not require any special muscular action. (It is only in forced expiration that the muscles, especially of the abdomen, are brought prominently into play, in which case the vesicular murmur is somewhat increased). Foster says "expiration is elastic reaction." For the above reasons the muscle tone of expiration is very slight, corresponding with the short vesicular murmur, while in inspiration muscular action is *very* prominent, corresponding to the long vesicular murmur in inspiration. Ingress and egress of air alone cannot account for this variation in the vesicular murmur in the two acts. I agree with Dr. Hoover in that a considerable portion of the vesicular murmur has a different origin from bronchial breathing, but the cause *I* attribute to the sound of muscular contraction.

The reason why the sound produced by muscular contraction has not been more generally recognized is on account of the humming or roaring which is always present when the ordinary stethoscope is applied by the contact of the fingers and thumbs, the muscle tone being conveyed in this way to the column of air within the instrument and thence to the ear; and because of this

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fact the presence or absence of this tone in the body under examination could not be ascertained.

This difficulty may be overcome in the following manner: first, by applying the stethoscope without the contact of the fingers, simply suspending it from the ears; second, applying it by the aid of a belt or other device to hold it in position; third, by using the oldfashioned monauralscope; fourth, by using a non-roaring stethoscope in which springs and non-conducting materials intervene between the fingers and the column of air within the instrument.

The muscular murmur plays a part also in certain tests of the hearing as, for example, holding one ear closed with the finger while testing the other with a watch or tuning fork. The muscle tone may be eliminated in this test by using an ear plug instead of the finger. This applies to Webber's Test, Bing's Test and the Speech Test. The following experiment is explanatory of this point: close both ears tightly with soft rubber plugs, and observe the distance at which the ticking of an ordinary alarm clock may be heard, holding it in front of the observer. Now remove the plugs and close the ears with the first finger of each hand and note how much shorter the distance at which the ticking may be heard. The distance with the plugs is four or five times greater than that with the fingers.

It appears from the above that we do not hear altogether with our ears, (at least through the external auditory canal) for when they are closed completely we are still able to hear sounds produced in the air and ordinary conversation may be carried on in a quite satisfactory manner with the ears so stoppered; even when the mouth and nose are held tightly closed in this experiment the result is the same.

The ticking of the clock, as mentioned above, may be heard at a distance of two or three feet when both ears are tightly closed by plugs and the nose and mouth held tightly shut. It is said that fish hear by bone conduction alone.

One more point and I will close. A soft rubber tube from the ear of one person to that of another permits either to hear the sound of a vibrating tuning fork placed on the head of the other on account of the vibrations which are set up in the middle

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ear, being carried through the column of air lying between the ear drums of the two individuals. If the conducting apparatus is impaired by disease, the sound conveyed from the diseased ear to the ear of the observer is feebler than that from the normal ear.

When I observed this latter fact, I constructed a bin-aural auscultation tube to be used as a test for the condition of the conducting apparatus of the ear, as follows: A soft rubber tube with a hard rubber ear piece leads from each ear of the patient, joining a single tube by means of a hard rubber Y-piece, the single tube leading to one ear of the observer and a hard rubber ear tube attached. Placing the vibrating tuning fork on the head of the patient while auscultating in the manner stated above, with the bin-aural auscultation tube, and alternately closing the tubes leading from the patient's ears, the feebleness of the sound from the diseased ear as compared with that from the normal ear is easily recognized, and corresponds with the degree of impairment of the conducting apparatus. Again, applying the tuning fork to the observer's head, the sound is heard louder by the normal ear of the patient.

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Section of Ophthalmology and Otology.

ADDRESS OF CHAIRMAN L. W. DEAN, IOWA CITY, IOWA.

Ladies and Gentlemen: It has been a question in my mind as to what I should say in making the few remarks that are expected from me.

The science of ophthalmology and otology has made such advances in the last year that it would be quite impossible to even mention the most important of them. The year books that are now published render such an address superfluous. It might not, however, be superfluous to call attention to the excellent contributions to our science that have come from the clinical laboratories. They have been most efficient aids in the understanding not only the pathology of many diseases but their therapy. The work here is exact. While not, perhaps, so interesting as clinical work, it is serving by contributing its quota of new ideas to our science. The studying of the anomalies of normal structures has certainly influenced greatly our operative procedures. Experimental pathology has added much to our knowledge of the etiology of disease and its therapy. It seems to me probable that in the next decade many of our important advances will be made along this line. I hope that Iowa will not be behind her sister states in this work. In order to do this work one does not need to be connected with a college or a large hospital. A small sum will furnish all the apparatus or material necessary for comprehensive work.

For several years I have thought much about the work of the ophthalmologists and otologists of the state in connection with this section. We have no state association of ophthalmology and otology. We do not need such an association. The work of this section can be made such that it will take the place of that of a state association. The trouble this year and in the past has been the lack of time. I understand that the constitution may be so changed that in the future this section will have one day. That ought to give us time enough not only for com-

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prehensive papers but for short reports on clinical cases and laboratory results. If the cases that you see and the observations that you make during the next year could be reported to this section at its next meeting, I feel sure that it would be of immense value.

Then again, one secures specimens, anatomical and pathological. Why should these not be saved and be brought here for the others to look at? I feel sure they would be interesting, and in addition to the interest that they create directly there would be the incentive given to the younger members of our profession who are constantly entering our ranks.

It is hard to try and work alone. We are unfortunate as compared with our brothers in the larger cities in that there are not enough of us close together so that we can meet once a month and discuss our work. We have to depend on the work of this section to supply that deficiency. If we will remember that what is interesting to any of us is interesting to all, we ought to increase the work of this section so that we would look forward to its meeting with great pleasure and the expectation of much profit. I have never attended a meeting of this section without receiving much good. With the increase in our time I think I ought to receive more benefit.

Then there is another thing, and in this some of you may disagree with me. The surgical section has work that we are not particularly interested in. The same is true of the medical, the obstetrical, and the other sections. The work in our section ought to be advanced work, such as will be of interest to those who work exclusively along these lines. Such contributions would be undoubtedly of interest to the general practitioner, but the one to be thought of first is the ophthalmologist and the otologist. There are so many troubles where there is such a difference of opinion as to the proper procedure. We do not always agree as to what is best in a given case but we would like to know what results others are securing. Two heads are better than one, and when there are several instead of two each gets some benefit.

Then we have the various new remedies. Nineteen are as a rule not useful, while the twentieth may be of great value.

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The experiences of those men who are dealing with many similar cases are only of value in estimatng the usefulness of these drugs. The general practitioner can secure good from these reports as well as ourselves.

Twenty years ago the number of oculists and aurists in this state could be counted on the fingers of your two hands. Today nearly every town of over five hundred inhabitants has one or more. We are a numerous body. We need a place to meet and exchange views upon our own subjects. The place for this is this section of the Iowa State Medical Society.

I hope that the work of this section year by year will become more exclusive and scientific.

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PREPARATION OF THE PATIENT FOR CATARACT EXTRACTION.

BY CASEY A. WOOD, M. D., D. C. L., PROFESSOR OF CLINICAL OPHTHALMOLOGY IN THE UNIVERSITY OF ILLINOIS, CHICAGO.

For the ordinary case of "senile" cataract, let us say in subjects over 60 years of age, that has undergone a slow and uniform process of maturation, where there are no glittering sectors to be seen in the anterior layers of the lens, where there is no shadow cast upon the latter by the iris, where projection is good, the tension normal and the pupil reaction prompt, and where, indeed, the oculo-lachrymal and nasal tracts, apart from the lenticular disease, are practically free from disease, the precautionary and preparatory measures I am about to discuss have but a slight value. In fact modern aseptic and antiseptic conditions, so strenuously insisted upon in recent years, have rather tended to convey the impression (and to fix it upon the mind of the rising generation of ophthalmic surgeons) that it matters little *how* we operate if we can only keep ourselves, our patients and our instruments clean. I am free to confess that if I were the subject of an uncomplicated, mature cataract of the senile type, I would entrust my case to the expert *operator* rather than to the man whose chief reliance is upon the sterilizer and the much washing of hands. On the other hand, were I unfortunate enough to possess a lenticular opacity not of the kind just described, I should feel better satisfied if the most elaborate aseptic ante- and post-operative measures were adopted.

You will, of course, pardon this trite introduction because the obvious deduction, viz: that the perfect surgeon is constantly mindful of *both* requirements for the largest percentage of success, and because we cannot predict the hour or the minute when an apparently uncomplicated cataract may, in any stage of operative interference, be the victim of those infective or other accidents so well known to all of us.

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Furthermore, although we must not ignore the fact that a comparative study of cases recorded by ophthalmic surgeons prior to 1880 and those of more recent years, does not reveal such a surprising difference in the *visual* results, we cannot and ought not to forget the shorter convalescence, the freedom from pain and other discomforts, the slighter reaction, the decrease in iritis, cyclitis, panophthalmitis and migratory ophthalmia, the relief to the anxieties of the surgeon and the patient's friends that have directly resulted from faithfully carrying out some routine plan that assumes possible infection of the corneal wound, or other accident, in *every* case of cataract extraction. The only satisfactory assurance that we shall not be found wanting and not have occasion to regret a failure to observe this or that precaution, is to take it in every instance. The moral effect of such preparations is of extreme value not only upon one's self but upon those with whom one comes in contact; it is as difficult to break a good habit as a bad one.

Whatever bearing it may have upon the ultimate success of the operation we should always inquire into the *general condition of the patient.* In my experience, which is perhaps not as extensive as that of some writers who hold an opposed opinion, neither diabetes nor advanced changes in the blood vessels, kidneys or heart, contraindicates the operation and does not to any noticeable extent interfere with the healing of the usual bulbar incision. However, if time permits, every systemic disturbance should be treated with the hope of improving the vitality of the patient and, so, his resisting powers against the accident of post-operative complications.

Knapp believes that *gout* and *rheumatism* should receive treatment before, during and after the operative period, because of the liability to iritis and cyclitis in cases complicated by these affections.

The cure or temporary relief of *cough,* whatever its origin, meaning, frequency or severity, has always been regarded as a *sine qua non* before the removal of cataract. While admitting the propriety of treating such cases and of taking every possible means of soothing the troublesome symptom, I cannot endorse the usual text book statements in this particular. Except in the

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case of frequent, severe, spasmodic or explosive coughing as in acute bronchitis, or in diseases requiring the patient to assume very suddenly and at any moment the upright position, I would not consider cough, as such, a contraindication to operation. Old people are subject to various forms of bronchial cough and we sometimes require to operate in cases of senile asthma. The administration of one-eighth of a grain of heroin, twenty grains of potassic bromide or, if not contraindicated, ten grains of Dover's powder at the time of operation—these remedies to be repeated in smaller doses as required—will usually suffice to quiet the annoying cough. It should, however, be the function of the family physician to decide what, under the circumstances, is best to be done.

In recent years cataract extraction is usually (and properly) done in a hospital. When that is the case it is wise to have the patient enter a day or two before the operation. Not only does he feel more at home and more favorably inclined to endure the restraint necessary after the operative ordeal but he becomes acquainted with his surrounding, especially with his nurse and, as a consequence, is more likely to sleep the first few nights succeeding the extraction. Another advantage gained by a preliminary residence in hospital is that the patient's habits, especially his dietary peculiarities, can be studied. Most cataract subjects, having long passed middle age, have fixed ideas about their creature comforts that, in the interests of mental peace and quiet, should be humored unless there is a distinct reason for prohibiting them. A few winters ago I extracted a diabetic cataract from a man, aged 62, who was an inveterate, unreasonable, and uncontrollable tobacco smoker. I reluctantly allowed him to consume two large cigars daily, including the day of extraction. He lay in bed with both eyes bandaged and contentedly puffed the smoke which he could not see. The case did well until the seventh day when he showed marked signs of conjunctival hyperaemia, with lachrymation and some pain. The date at which the increased vascularity showed itself, the fact that the wound had closed, the absence of tenderness—all pointed to a very recent irritation. I had stopped the atropia first ordered and had discarded the bandage as a constant dressing

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but, as the hyperaemia continued, I was at a loss to understand the cause of the trouble. After leaving the hospital the eye got promptly well and the patient then confessed to me that he had induced the nurse to leave him alone, on the pretense of sleep, several times during the day and night. On these occasions he enjoyed many additional and "genuine cigars with real smoke that could not only be smelled but seen." He had accomplished this purpose and escaped detection by pushing his body partly through the large ventilating pane of a "storm" window, his head unprotected by any hat, one eye uncovered and the other wearing a light shade and his bare neck exposed to the howling blasts of winter!

In the same way I do not consider it wise to do more than restrict somewhat *the patient's allowance of alcohol.* Quite apart from the occurrence of delirium tremens which has been noticed after operations on, and the confinement of chronic drinkers, the comfort, to say nothing of the sleep and mental peace, is certainly promoted, for a time at least, by the usual number of drams per diem.

Patients are sometimes unable to sleep unless they have a particular kind of pillow, sheet, blanket or mattress, or unless the room is of a certain temperature or unless the door is opened or closed, locked or latched, or unless somebody else sleeps in the same room. In my opinion it it well worth our while to humor these harmless whims, because undisturbed sleep is so desirable for the first night or two after the operation. If the patient spends a few preparatory nights in hospital he is usually quite willing to suggest improvements that will minister to his post-operative comfort.

We must always remember that old and decrepit people occasionally *die suddenly* after cataract extraction and, when from the condition of the patient such a termination is considered possible, all persons concerned should be notified before the extraction is attempted. In all probability this fatal issue is due, not so much to active organic disease, as to shock, confinement to bed amid strange surroundings and to other disturbing impressions.

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Most cataract subjects, especially the active, the fat and the plethoric, need a reduction in their diet list and a saline laxative before breakfast (the earlier in the morning the better) for two or three days before the operation. One of the most satisfactory doses of this kind, suggested to me by my colleague, Dr. W. E. Gamble of Chicago, is a drachm each of Glauber's and epsom salts dissolved in an ounce of cool water, followed by a large tumblerful of hot water.

Of course, the most important preparatory treatment is that of the ocular region. Systematic *cleansing of the nasal cavities*, advocated by Lippincott, is to my mind of great importance, whether there is evident disease of the lachrymonasal tract or not. Beginning a few days before operating, Lippincott, in every case, sprays out, two or three times daily, both nostrils with 1:2000 potassium permanganate. This is also done immediately before operation and repeated for four or five days after the extraction, and undoubtedly has a good influence on the healing process. If the permanganate solution prove too irritating, a nasal douche (1 to 4) of glycothymoline will be found effective. In addition to this routine treatment I would strongly advise as a precautionary measure that the nasal meati and neighboring cavities be carefully scanned for anomalies so that they may be remedied or at least rendered as harmless as possible.

It is not necessary for me to point out how exceedingly dangerous is a *suppurative dacryocystitis* or even a nasal duct obstruction in an attempted removal of cataract. Probably germ colonies from the lachrymal sac is the commonest source of wound infection after incisions into the eyeball. Not only should we be sure that the drainage of the lachrymal passages is sufficient but I am in favor of freely using Anel's syringe, with 10% argyrol solution, 1:5000 formaline or 1% salt solution, just prior to and for several days after every extraction in which the eye becomes red when the "test bandage" is applied. I shall speak of this bandage later. What shall be done when there is a nasal obstruction with regurgitation of infected mucous and tears into the conjunctival sac? You will remember that the answer is generally furnished by the experiments and experiences of

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Mendel and Hirschberg* on the technique of cataract extraction in persons having only one eye, or who have already lost the sight of one eye as the result of a previous operation on the globe. Hirschberg took, in his cases, not only the precautions we have just discussed, but treated for several weeks, by probing and local medication, the lachrymal route from the conjunctiva to the nose.

Time does not always allow us to continue for a sufficiently long time this lachrymal treatment, and I desire, therefore, to draw your attention to the means from time to time advised for shutting off lachrymonasal sources of infection until the danger of wound infection has passed. The sealing of the puncta by searing them and a small extent of the canaliculi with the actual cautery is certainly effective, but it interferes with the subsequent treatment of the dacryocystitis and is needlessly destructive. The plan recently revived by Bullert and mentioned by Knapp in Norris and Oliver's Text Book is one which I can strongly recommend to those of you who have not tried it. Two months ago there was sent to me from a distance a gentleman aged 72 with double cataract, slightly advanced in one (the blinder eye) which presented several corneal scars, and almost mature in the second eye. He had in both eyes the usual sequelae of an old but cured trachoma, dilated lachrymal sacs, obstructed nasal ducts and a chronic purulent dacryocystitis. It was not convenient to subject him to a long course of treatment for the naso-lachrymal complications, and as he had intact canaliculi I determined to operate at once. After a few days preparation I syringed out and filled up both upper and lower canals as well as the sac with 20% argyrol solution. I then passed a No. 2 black silk, braided suture, prepared by soaking in sterile vaseline-paraffine, around each canaliculus, 2mm. from the punctum. This was firmly tied on the skin surface of the lid margins and cut off close to the knot. The extraction was successfully done, and wound promptly healed and recovery took place without incident. The sutures were removed on the eighth day and, as proof of the fact that no adhesion occurred between the op-

*—Berliner klin. Wochenschrift, June, 1900.

†—Transactions of the Am. Oph. Soc'y, 1902.

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posing walls of the canaliculi the argyrol injected immediately before the operation, welled out into the conjunctival sac. Further treatment, for the cure of the nasal duct obstruction, was proposed to a surgeon in the patient's town.

Where the canaliculi have already been slit up I would advise careful preparation of the patient by the Hirschberg method before undertaking the operation.

There are numerous other affections of the lids and globe that should be treated as a preliminary to the removal of cataract. *Pterygium* should be removed so that the ocular conjunctiva be as smooth as possible and present no nidus for bacterial growth. *Chalazia* should be excised or curetted; their conjunctival aspect is usually roughened and granular, furnishing secretions inimical to the ready healing of a corneal wound. *Entropion* is serious complication of cataract extraction, particularly when it is accompanied by incurving cilia, that ought to receive operative attention.

The evening before the day of the operation (I usually operate in the morning because I believe both patient and surgeon are in better trim for the ordeal and because I occasionally give a general anaesthetic) I am in the habit of shaving the eyebrows, cutting off the eyelashes, and, when I can manage it, removing all hair from the face. In people who carefully observe the laws of personal hygiene perhaps the removal of the moustache and whiskers is uncalled for and ought not be insisted upon, but it certainly minimizes the sources of infection. In any event. these hirsute appendages should be thoroughly washed with hot water and soap, followed by an alcohol rub, in every instance. I object to facial hair not so much as a source of direct but of indirect infection; it is almost impossible to prevent the instruments, the sponges, the dressings and the hands of the surgeon or of his assistants from coming in contact with it in some stage of an operation or during the subsequent ocular toilet. The head hair ought always to be confined in a rubber cap (which is better than a mob cap) or towel; irrigating fluids and other liquid applications are prone to wet the latter and to invite sneezing and coughing, not to mention the disquiet attendant upon efforts to dry the hairy mass. I clip the eylashes not because they cannot be fairly well sterilized but because mucous and other secre-

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tions from the eye operated on cling to them, especially when a bandage is applied, thus increasing the dangers of infecting the eye and making it necessary to disturb the dressing to remove the marginal collection.

The lids ought to be gently massaged (the evening before the operation) to squeeze out the contents of the meibomian follicles (where secretions are often infected) as well as the mucous from the sac. The conjunctiva, especially of the everted sulci are at this time also thoroughly irrigated with warm 0.75% sodic chloride, 1:5000 formalin or a saturated solution of boric acid, as the condition of this membrane seems to indicate. We have long known, from the experiments of Gayet, Gifford and many others, that even the apparently normal conjunctiva cannot be rendered entirely sterile by antiseptics of any kind or strength. For this reason I have long abandoned the use of mercuric chloride as an antiseptic wash for the eye in operations. I believe it does more harm in irritating the ocular structures and by disturbing their vascular supply than it does good as a deterrent of microbic growth. Moreover, Gasparinni among others, long ago proved conclusively that it is the mechanical washing away of germs and toxins with sterile water or mild detergent solution and not some powerful chemical dissolved in it, that renders the conjunctival sac comparatively aseptic.

The facial, palpebral and frontal skin is thoroughly washed with warm water and ethereal soap solution, followed by irrigation with sterile water. The patient is given a warm water and soap scrub, before retiring, after which a "test" bandage of damp sterile gauze is adjusted over both eyes. Next morning, an hour before the time set for the operation and after the patient has breakfasted, the eye to be operated on is carefully examined for hyperaemia of the conjunctiva or mucoid secretions, and if either is present the operation is postponed.

After many years' consideration of the subject I am satisfied that as long as the ocular or palpebral conjunctiva is not rough or granular, and as long as there is no decided increase in the mucous discharge from it, the operation can be performed without danger; merely thickened or red conjunctiva should make us more careful to insist upon subsequent irrigations. The *test bandage* is useful not merely to protect the eye during the

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night, but to enable us to see it at its worst just before the operation. If there is a marked tendency to hyperaemia of the anterior vessels of the eye or to increased secretion the bandage will surely develop it.

If it is decided to proceed with the operation all the nasal, lachrymal and ocular applications of the previous night are repeated and the patient is ready for the operating table.

The question of doing the operation on an *operating table* in a room specially prepared for the purpose, or *on the bed* to be subsequently occupied by the patient should be answered after duly considering the circumstances in each case. On the whole, I favor the latter plan, although there are undoubted difficulties that present themselves in carrying out all the details of a properly conducted technique. The consideration that weighs most with me is the patient's feelings; most people prefer to be operated on in their own room or ward.

Many years ago I first saw deWecker do his cataract extractions *by artificial illumination.* I have since become convinced that with the improvements in electric lighting it is more satisfactory to use the incandescent lamp than to depend upon sunlight.

As regards the *time of day for cataract extraction* I am decidedly in favor of the hour after breakfast. Both patient and operator are at this time in the best trim for the ordeal, and there is no long, depressing interval of apprehension and (bandaged) blindness to be tided over during the waking hours that precede the operation. Moreover, it is sometimes necessary to give a general anaesthetic, and that is best done on an empty stomach *and* in the morning. Before cocainizing the eye, and after the preliminary irrigation, I would advise the operator to *massage with the forefinger,* gently but firmly, the lids over the eyeball. This dislodges secretions from the retrotarsal folds, empties the meibomian follicles and external lachrymal passages and cleanses the anterior portion of the eye. The lids should now be thoroughly everted and carefully rubbed with cotton mounted on a probe and wet with boric acid solution. In all these manipulations one should be careful not to cause the patient any marked discomfort. For a number of reasons, I am not in favor of wiping off or rubbing the corneal field of opera-

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tion; in my opinion it subserves no useful purpose and almost always irritates the eye.

The *local anaesthetic* that I prefer, is a mixture of cocaine (4%) and holocain (1%), first brought to my notice by Dr. Frank Allport, because I believe this preparation produces the maximum amount of anaesthesia with the employment of the minimum amount of cocaine; one must not forget the bad effects of the latter drug on the corneal epithelium. It is well to instill a drop into the opposite eye; the patient will be less likely to squeeze together without warning the lids of the eye under operation if a drop of liquid accidentally fall into the other eye during the operation.

When the patient is on the operating table or bed he should be *exercised in opening and closing his eyes* properly and in rotating them in various directions. This not only gives him confidence, but enables the operator to exercise more complete control of the ocular movements at critical periods during the extraction. Always speak to him in as low tones as possible; present at least the appearance of leisurely movement, and tell him "not to get nervous until he notices that you are nervous." It is also well to add that there will be little or no pain connected with the operation, and that you will notify him in advance if it is necessary to hurt him. As a last injunction, he should be warned, never, under any circumstances, to squeeze his lids together.

It seems hardly necessary to insist upon the need of having *ready* not only *the instruments* for a normal extraction, but all those that may be required for every possible emergency; still I have experienced and have witnessed the flurried assistant take out of a distant operating case and present to the operator an insufficiently sterilized instrument whose need was not forseen. The surgeon should always make a preliminary inspection of the instruments laid out for his use.

Finally, a single layer of gauze, with holes cut in it corresponding to the nose and the two eyes, and large enough to cover the whole face and forehead should be wet and carefully and smoothly applied to the parts. This sticks firmly to the skin

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and prevents contact of the hands and instruments with the former.

Having in this way made all the preparations that the operation requires one should go ahead with it in confidence, feeling that whatever the outcome be, no blame can be attached to the operator from the standpoint of the patient's preparation.

Discussion of the Paper of Dr. Wood.

DR. L. W. DEAN, of Iowa City.—*Mr. President.* This paper has been of so much benefit to me that I feel like taking the liberty of asking the essayist some questions about things which are not necessarily dealt with in his paper, and I hope Dr. Wood will be kind enough to answer some of them. One of them was a question which he rather indirectly referred to, and that is with reference to giving an anaesthetic. I would like to know whether he had reference to a general anaesthetic, such as ether or chloroform? If so, under what circumstances he would give it.

There is one thing that bothers me at various times, and it is a point upon which I would like some information. If you have a patient who has undergone a cataract operation, and the next day, in spite of preparatory treatment, which perhaps was not as perfect as it ought to be, he has a cough which will not yield to the ordinary sedatives that the general practitioner gives, or he complains of a disturbance in the gastric region, or he is restless because he cannot sit up, I would like to know whether Dr. Wood would have him stay in bed.

Another question. How long after a cataract operation, under ordinary circumstances, is it before you allow the patient to walk around?

There is one more question. You give a patient fairly good preparatory treatment and feel that you have the intestinal tract well cleaned out, and after the operation they get nothing except liquid food, and still these people on the second or third day, sometimes on the first day, will insist on having a laxative. I wonder what Dr. Wood would advise or do under such circumstances?

With reference to people smoking in the room, I have had difficulty with some men who have undergone cataract opera-

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tions who insisted on smoking; but my trouble has been largely with the women. They smoke pipes, the odor permeates all the rooms, so that there is a general expression of ill-feeling on the part of the nurses and other patients. In this connection I wish to say that I have found out it is not wise to try and remove morphine from a morphine fiend after a cataract operation. If they are not supplied with it when they ask for it, there is likely to be trouble. I have had some experience that has not been very pleasant in this regard, and we have gotten along much better by giving patients morphine who were accustomed to it and recommending a cure of the habit later.

DR. IRA K. GARDNER, of New Hampton.—I am not an ophthalmologist. I am a good deal like the boy who attended a party; he came home and told his father that he had been to a party, and had had a good time except that one thing happened, and that was a little boy fell off the chair and everybody laughed but himself. The father said, "Why did you not laugh?" The boy replied, "I am the little boy who fell off the chair." I am in that condition. I am the fellow who underwent an operation for cataract in Chicago last August on one of my eyes.

I have listened to Dr. Wood's paper with marked attention, and I drank in everything that was said by him, and it certainly meets with my approbation personally. There are a few things I would like to discuss in connection with this subject from a personal standpoint.

With reference to pain, I will say to any unfortunate brothers who may go to the block, that it was a great bugaboo to me; and yet the pain following cocaine anaesthesia is so slight as scarcely to be mentioned.

I would ask this question, What is the practice with reference to preliminary iridectomy? Of course, this goes a little farther, I understand, than the subject matter of Dr. Wood's paper. The paper leads up to the point of doing something to the eye, and he has instructed us what to do up to that point. The man whom I engaged and talked with did a preliminary iridectomy. This hurt me more after the flap was made than snipping the iris with forceps. I was glad when they snipped it off. I knew all the steps of the operation; I knew too much of

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what was going on, and while I did not suffer very much, I was willing to have them quit. The question arises in my mind, when I go to the block again, whether I shall have a preliminary iridectomy performed or not. I did not have any reaction from the extraction, which was done six or seven weeks after the preliminary iridectomy, and the length of time I was confined to the hospital was four days. On the fourth day the bandage was taken off of the unoperated eye, and I was eventually allowed to have the other eye exposed. I stayed in bed until the latter part of the fourth day. I had a special nurse. I was anxious about the outcome, because it was my eye.

I was interested in the paper, as it is instructive to all of us. While the matter of preliminary detail may seem excessive, yet it has an important bearing upon the question of possible subsequent infection.

DR. R. M. LAPSLEY, of Keokuk.—I did not intend to say anything in connection with Dr. Wood's paper, because he has had a good deal more experience than most of the rest of us, but I wish to thank him for the many excellent points he has given us from the large experience he has had, which will benefit those who deal with cataract extraction. There is no doubt but what most cataract cases, as the doctor has stated, get along beautifully without preliminary iridectomies. I have had the privilege of doing and seeing a number of cases of operations for cataract in Haab's clinic, where there was no chance to make the proper preparations, and yet the most brilliant results were obtained in some of those cases. We should not forget the *vis medicatrix naturae* in those cases that do not have the proper preliminary preparations. We need to be instructed in regard to those cases that do not do well, and I think we have been instructed a great deal in regard to the treatment of such cases. I operated on a diabetic case which I have thought of a good many times since the operation. The patient died about two weeks afterward, and possibly the operation had something to do with death. Dr. Wood did not say as much about these cases as I hoped he would. Of course, he cannot tell us everything about them in one evening.

I was also interested in regard to the point of coughing on part of the patient after operation, and was glad to hear the

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essayist say he did not regard it as a particularly serious matter. I recall one case, apparently an ideal one, which did well for the first twenty-four hour after operation, then he began to cough and continued to do so, so that the eye was totally destroyed by infection.

I would like to ask Dr. Wood how long he confines patients to bed after these operations?

DR. WOOD (closing the discussion).—In referring to the administration of an anaesthetic, I should have said a general anaesthetic. I practically never give a general anaesthetic for cataract extraction, as there is no pain practically connected with this operation. On rare occasions, however, one runs across a patient who is so nervous, so wrought up, that it becomes a question which is the greater evil, to run the risk of nausea and vomiting which follow general anaesthesia in many cases, and which are not good things to have after extraction of the cataract, or to take chances of going along and doing the operation with a local anaesthetic, and then have the patient in the midst of making the incision in the eyeball throw up her hands and spoil the eye entirely, or interfere materially with your efforts to extract the cataract. I have in the last two years given a general anaesthetic once for the removal of cataract, and it was in such a case.

My routine practice with regard to allowing patients to get up is this: I am most afraid of hernia of the iris, or of the iris protruding from the wound incision, forming there, and giving trouble afterwards. Sometimes an eye may be lost on this account. Experience teaches us that when the incision or wound opens, it occurs in about twenty-four hours. I examine the wound at the end of about twenty-four hours, and if it has not opened, then I feel it will not open at all. There are many reasons why it is desirable to have old people get up and not stay in bed after cataract extractions. I have them sitting up in a rocking-chair on the second day, if possible, as a good many of these old people feel more comfortable in a rocking-chair, although they are cautioned not to rock, and this works well. Of course, where I have to replace or cut off a portion of the prolapsed iris, I put the patient back to bed again. As a rule,

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I let them get up as soon as I can, and this is on the second or third day. In a patient with severe cough, rather than have him or her, as the case may be, go blind, if there is no possibility of leakage from the operation, I prefer in the presence of cough to await the chances of complication.

With reference to the question of a preliminary iridectomy, I do it where the cataract is not mature. A preliminary iridectomy enables one to extract the cataract more easily; it hurries the ripening of the cataract. Of course, there are some surgeons who always do a preliminary iridectomy in these cases, but I am not in accord with them.

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MEDICAL TREATMENT OF CHRONIC OTORRHOEA.

ROBERT M. LAPSLEY, M. D., KEOKUK, IOWA.

Mr. President: Cleanliness is the first principle in the treatment of chronic otorrhoea. Various methods of cleansing the ear have been tried, and no method is adapted to all cases. At the first examination of the ear it is my practice to cleanse the ear as well as possible by means of hydrogen dioxide and syringing, and then using absorbent cotton pledgets. Many cases of disease of the attic, or even where the attic is not much affected, and a small perforation exists, can hardly be thoroughly cleansed at all. In some cases inflation of the tympanum through the Eustachian tube will be an aid to the cleansing process.

Syringing the ear with an ordinary ear syringe is not effective in cases of attic disease, and the attic syringe should also be used. Cholesteatomous masses may be loosened by the curette. Siegle's otoscope is an aid where the secretion is not too thick, and may help bring the secretion in reach of the syringe. Many otologists seem to object to hydrogen dioxide and the syringe as cleansing agents, but in the first examination, at least, in most of the cases, I think, it is necessary to use moisture to get the ear in proper condition for examination, and farther treatment. The ear cleansed, is in proper shape for examination as to size and location of perforations, and to form conclusions as to the proper method of treatment.

I will review briefly both the moist and dry treatment, as I find I can sometimes use one successfully, and sometimes the other, and frequently resort to both methods in the same case, at different times, believing both useful, in what I might term different stages of the disease. Commencing with the moist treatment, following the cleansing already detailed, antiseptics and astringents are useful. I find boracic acid fifteen grains to the ounce of 50% alcohol, and afterwards pure alcohol when the ear can tolerate it, dropped in the ear, and allowed to remain ten minutes, is often followed by gratifying results. The treatment should be repeated once a day. I might, in this connection, re-

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port a number of cases where seemingly brilliant results have followed the alcohol treatment. On following the cases, however, some of the most brilliant ones have relapsed.

At subsequent treatments, the method of cleansing described may be necessary, but where the secretion is scant, it may be possible to wipe out the secretion with dry cotton, or cotton dipped in hydrogen dioxide. The point I wish to make about cleansing is, that the ear should be as clean as possible, whether this result be obtained by moist or dry methods. The alcohol treatment should be given a trial of two weeks, if that long a time is necessary, then if the discharge is still as profuse and offensive as at first, or the gain only very slight, nitrate of silver is often of benefit. Such ears are generally very tolerant of strong solutions. The auricle is painted first with potassium iodide, then a 60 grain to the ounce solution of silver nitrate is introduced into the ear, and the head held to one side, and the solution allowed to remain from one to five minutes. One minute is generally long enough. Following this the ear is syringed, but the syringe should be introduced beyond the potassium solution so as not to neutralize the silver, and cause a precipitate in the tympanum. The ear is then dried. This treatment is to be repeated in from two to four days, and after two or three applications, return to the alcohol treatment, or perhaps, to the dry treatment, and the result should show in the course of a week. Many other remedies are used and it is often necessary to make a change.

In recent years much has been said of camphoroxol as a local antiseptic and astringent in the treatment of purulent otitis, and it is an excellent one, and should be used in a similar manner to the alcohol treatment. So far I have not been able to conclude whether it is superior to the alcohol treatment or not, but, at any rate, it is another useful antiseptic, and we often need a change.

In the introduction of remedies in the ear, if done through the meatus, some force, by means of a masseur, is often necessary to get the remedy in contact with diseased parts. Much force cannot be applied, or the fluids may be forced with infectious materials into healthy regions, closely connected with the diseased.

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I wish now to briefly review the dry treatment of chronic otorrhoea. The dry treatment has been extensively used in recent years, and, at any rate, an approximately dry treatment seems the wisest one. In cleansing the ear with the syringe, there is some danger of forcing infected material into the deeper recesses of the ear which are not yet diseased, hence if the dry cleansing will cleanse, it is better. Also some ears react badly to the use of moisture, and whenever moisture is used the discharges increase. In cleansing the ear by the dry method it is wiped out with dry cotton. If necessary Siegle's otoscope is used to aid in drawing the pus in range of the cotton carrier. Inflation through the Eustachian tube is, at times, useful in driving the secretion from the tympanum.

When the ear is cleansed and is quite dry, a wick of gauze is introduced lightly into the ear, with the inner end at the perforation, and the secretion will be absorbed and carried away from the tympanum. To make this effective the gauze must be changed often enough to keep a portion of it dry. If left in long enough to be saturated, it is possibly worse than useless. The amount of discharge would regulate the length of time between treatments, but generally it should not be longer than two days. The dry treatment of otorrhoea will probably be much increased in usefulness by the use of superheated air in the middle ear.

The exact position of superheated air in the treatment of ear disease is not yet established, but it will likely be of considerable assistance in some of these cases.

To some extent I have put the cart before the horse, for now I want to mention the cases of purulent otitis where granulation tissue and polypoid growths exist, and they may need removal before applying the methods of treatment mentioned. To these cases the application of chromic acid fused on a probe will at times be required. The use of nitrate of silver in 60 grains to the ounce solution may be sufficient. The alcohol treatment may shrink the granulation tissue. If necessary, surgical means of removing polypoid growths and granulations will be resorted to before making much use of the medical treatments. It is not uncommon for me to change from one method of treatment to the other, or to combine, by using some moisture in cleansing

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the ear, then drying and introducing the gauze wick. Also, at times, after cleansing the ear and drying, I inflate a small amount of boracic acid powder and follow with gauze wick.

It is not uncommon to find an ear in which one method of treatment may be used, then a change made, and afterward, on resorting to the first method of treatment, a rapid drying of the ear results, when in the first place it had not been satisfactory.

I will not leave this subject without mentioning the fact that the nose and throat should also receive the necessary treatment, if we hope for success in medical treatment of the ear. It is not my province to go into detail in regard to treatment of the throat and nose. As far as medicine as an application to the ear is concerned, it can usually be used through the external meatus direct, or by an attic syringe. In many patients also the general system needs treatment, and the effect of systematic treatment and regulation of habits, will have much to do with the slow, gradual development of a more healthy local condition, just as it also does in the improvement of chronic inflammations of the mucous membranes of the nose and throat.

We cannot expect to cure all cases by any of these means, but a few weeks treatment will cure quite a per cent. of these cases. True, some of them relapse and have to be treated again. Still, if diseased bone is not present, they may be gradually improved, and be in little danger of serious complications.

It is yet beyond the knowledge of man to tell just which cases may be cured, and, while the microscopic findings of dead bone particles in an ear discharge that is quite offensive, make one doubtful of the effectiveness of treatment, still it is wise to give the patient the chance at cure by medical means.

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OSSICULECTOMY AND CURETTEMENT IN THE TREATMENT OF CHRONIC OTORRHOEA.

H. B. GRATIOT, DUBUQUE, IOWA.

Ossiculectomy has passed the experimental stage and is now recognized as one of the important operations for the relief of chronic otorrhoea. Like all advances in medicine it has been heralded as a panacea for the relief of almost all chronic diseases the middle ear is heir to, had its reaction, and has now settled down to its rightful place as a valuable surgical procedure for the relief of a fair proportion of the cases of chronic suppurative otitis media. The attention of the medical profession was first called to ossiculectomy in 1875 by Kessel, (1) who removed the membrana tympani, malleus, and incus for the purpose of improving the hearing. Schwartze (2) had removed the malleus and drum membrane at an earlier date, (1873). In 1886 Sexton (3), of New York, read a paper before the American Otological Society, describing the same operation for the relief of chronic suppurative otitis media and was one of the first to operate in this manner. Since that time the operation has been quite generally performed for the relief of chronic otorrhoea.

The majority of writers on the treatment of chronic middle ear suppuration seem to agree that the general run of cases are to be first subjected to a course of local or medical treatment for from one to several months, according to the effect on the diseased condition. Failing to get any marked benefit from this conservative plan, the next step is to adopt the least radical surgical treatment and remove what remains of the membrana tympani and ossicles, and thoroughly curette all diseased areas within reach. A fair proportion of cures will result from this method, especially where the disease has not involved the pneumatic spaces adjacent to the tympanic cavity, the latter condition will be benefitted only by the radical mastoid operation. If a differential diagnosis in each individual were possible, the task would be much easier and we would be able to select the correct course of treatment in each case, but unfortunately in the major-

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ity this is not possible. However, in the cases where there exists extensive involvement of the mastoid bone, which are the cases demanding prompt and radical treatment, we are generally able to make a fairly positive diagnosis of the condition and adopt the only rational course at once without wasting valuable time with conservatism. There are notable exceptions to this rule, but in the absence of positive evidence we are generally safe in adopting the more conservative treatment before subjecting the patient to complete exenteration.

Recently, since the technique of the radical mastoid operation has been improved upon, there has been a tendency on the part of a few able men to abandon all other forms of treatment and resort at once to this operation. This seems to be going from one extreme to the other and no more justifiable than the application of forceps in every case of labor. The published records of cases treated by the more conservative methods are convincing enough to warrant giving them a fair and conscientious trial before resorting to the external operation.

It is not deemed necessary to go extensively into the details of the technique of the operation, but to allude briefly to a few points which seem to me essential to a successful termination.

The upright position for the patient is the preferable one, but in the use of chloroform and ether anaesthesia this is not practicable and the recumbent posture will answer very well. When the operation is done in the physician's office or a well equipped hospital, the head mirror and reflected light from a suitable adjustable gas burner, or the electric head light, will furnish the best sources of illumination. In private houses, where these conveniences are not to be had the head mirror and reflected light from a window will answer very nicely.

Local anaesthesia obtained by the application of cocaine has been used and recommended by some competent men, but general anaesthesia is essential to a thorough operation unless the patient is an exceedingly docile one. Chloroform is probably the best general anaesthetic and is preferable to ether in that the disagreeable after effects are avoided, and the latter preparation is apt to produce more or less congestion of the membranes

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lining the tympanic cavity. Alderton (4) uses nitrous oxide gas, "preferring it because of the quickness with which the patient is anaesthetized, the lack of danger, the ability to keep the patient in the upright position, and the rapid recovery from the effects, usually without nausea." Except for its brevity of action it should be an ideal anaesthetic.

After the field has been rendered as nearly aseptic as possible, the use of a solution of adrenalin 1-5000 will make the operation comparatively bloodless.

As a rule little difficulty will be experienced in removing what remains of the drum membrane and malleus, and very often the long process of the incus will be brought into view after the removal of this ossicle, and in this instance will be quite as easily extracted. If the incus is out of sight it is drawn down into the tympanum by Ludwig's incus hook and removed with forceps. In carrying out this step of the operation it is to be remembered that the ossicle lies close to the margin of the tympanic ring and the angular portion of the hook should be kept close on the margin of the ring during the manipulation. It is largely a matter of individual preference whether the hook is swept from before backward and downward through the tympanic vault or whether the process is reversed. In the backward sweep it is possible to dislocate a small fragment of the bone into the mastoid antrum, and for this reason Dench (5) and others have recommended the forward sweep of the hook. Very frequently the incus is almost completely destroyed by caries, only a small part of the body of the bone remaining, and in this instance the operation is often prolonged, requiring an extensive search with the hook and attic forceps to dislodge the small remaining fragment. In case the bone is firmly ankylosed considerable force will be required to dislodge it, and it may become necessary to resort to the angular knife to divide the firm connective tissue-bands before it will be possible to extract the fragment. If all efforts at extraction of the incus fail the floor of the tympanic vault should be cut away when, very frequently, the remaining portion can be seen and easily extracted. When it is considered that the incus is carious in about eighty per cent. of the cases (6) of otorrhoea it will at once become apparent that its thorough

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removal is one of the most essential parts of the operation. Even a small fragment of this ossicle remaining is sufficient to cause the suppuration to continue indefinitely, and failure to carry out this step is one of the commonest causes of an unsuccessful outcome. I have recently obtained complete cessation of all discharge by removing a small fragment of the incus in a case which had had an incomplete ossiculectomy two years previously with only partial relief following the initial operation, and I suspect that this has been the cause of one other failure in my practice. When the floor of the tympanic vault is carious it should be removed as thoroughly as possible with the sharp curette or, what is probably still better, the angular rongeur forceps devised by Dench for this purpose. Where any extensive caries exists in this locality it is better to resort to the external operation as it is almost impossible to do any thorough work through the narrow external auditory canal.

Following the thorough removal of the ossicles the entire middle ear should be curetted, especially the tympanic vault, and some operators advise introducing the curette well into the tympanic orifice of the Eustachian tube so as to cause a closure of this tube if possible.

Accidents during the operation are rare. Dench (7) speaks of having wounded the jugular bulb and believes the same accident could happen to the internal carotid. The chorda tympani nerve is almost necessarily injured but the resulting loss of taste is transient. Injury to the seventh nerve is not uncommon but the resulting facial paralysis is rarely of very long duration.

Following the operation the ear should be thoroughly irrigated with a warm aseptic solution, dried, and lightly packed with plain sterile gauze or absorbent cotton. This dressing may be renewed at the end of twenty-four hours. As a rule there will be little reaction and the patient will be able to be about at the end of twenty-four or forty-eight hours.

By thus clearing the drum cavity, free drainage is established, medication is rendered less difficult, and if the operation has not been too long deferred, extension of the necrosis to the adjacent spaces is prevented. In a small proportion of cases complete recovery will immediately follow the operation, but

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in the majority a course of after treatment will be necessary to complete the cure. Absolute cleanliness is the chief factor and it matters little what method is employed so long as we attain this end. Irrigations are preferred by some operators while others resort entirely to cotton applicators to cleanse the parts. Irrigation furnishes an excellent mechanical process for cleansing the ear and, where the discharge is profuse, it is almost essential to thorough cleanliness and no possible harm can come from its judicious use. The solution to be used is not of prime importance so long as it is of a mild and unirritating character. A warm saturated solution of boric acid or one of bichloride of mercury, (1-10,000) or plain sterile water will answer the purpose admirably. The solution should be moderately warm and should be injected with moderate force. After the ear has been thoroughly cleared of all discharge in this manner, the middle ear and external auditory canal should be thoroughly dried with cotton applicators. The use of hot air through the external auditory canal will greatly aid in this drying process. If the discharge is scant it is better to dispense with the irrigations and use the dry method, which consists in thoroughly wiping away all discharge with cotton applicators. In conjunction with either of the above methods of cleansing the middle ear the use of an instrument which will produce a vacuum in the external auditory canal, such as a Delstanche's masseur, or an ear pump which will allow of suction alone being employed, will greatly aid the process by draining the secretions from the pockets and recesses of the middle ear into the external auditory canal from which it can be easily removed with cotton pledgets. The use of the Eustachian catheter is also of value in the post-operative treatment of these cases. Where there is any epithelial debris in the middle ear peroxide of hydrogen may be instilled and allowed to remain for a few moments before syringing to break up the masses. This cleansing process should be carried out by the physician at least once a day immediately after the operation, and the periods between treatments gradually lengthened as the discharge becomes less in amount.

Some cases will not require any more extensive after treatment than thorough cleanliness and efficient drainage, while

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others will need applications of remedies directed toward the reduction of the diseased condition of the lining membrane. The time honored silver preparation remains the sovereign remedy, and where there are no definite conditions to indicate the line of treatment which will most likely prove beneficial, no mistake can be made in beginning with a weak nitrate of silver solution and gradually increase the strength as tolerance is acquired. Every other day is often enough for this treatment, and when stronger solutions of silver are employed once or twice a week. It is advisable to change the treatment at frequent intervals and substitute some other astringent for the silver for a time. Sulphate of zinc may be used, or what has proved more beneficial, cuprol, which is applied full strength, with a suitable powder blower, in a thin layer over the tympanic cavity. Where granulations are present alcohol should be used, diluted at first and increased to full strength as tolerance is reached. The application of a 50% solution of lactic acid to areas of denuded bone will hasten the process of healing over.

The tympanic cavity should be again thoroughly dried after the treatment is completed and a wick of absorbent cotton, or plain sterile gauze, inserted and allowed to remain until the next treatment. Where the discharge is very profuse it is better to have the patient present for treatment twice a day rather than depend on the patient or parents to carry out any form of home treatment. It is only in very rare instances that any benefit will be obtained from such a plan. Where a well equipped hospital is at hand, the course of after treatment can be materially shortened by placing these patients in such an institution and having an intelligent trained nurse attend to the cleansing of the ear as many times during the day as it seems necessary to keep the ear free from secretions. It is rather difficult to get patients to submit to this plan of treatment, but it will rarely require more than two or three weeks before the discharge will be so much diminished that one visit a day to the physician's office will be all that will be required. In comparing the length of the course of after treatment in cases treated in the hospital with those treated entirely at home and at the office, I find that the average duration was six weeks for the former and three months for the latter.

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The period of after treatment will vary. Some cases will require only a few weeks while others will require many months before the discharge will entirely cease. Even after this favorable condition has been brought about, the case should be kept under observation for at least one year, in order to remove any granulation tissue or scabbing that is likely to occur.

The statistics of results obtained in cases of chronic otorrhoea treated by ossiculectomy vary with different authorities. One eminent otologist says, "he has never observed one brilliant result to follow the operation," (7) while others claim no less than ninety-eight per cent. of cures (8).

Out of ninety-two cases operated upon, Dench reports fifty-three cures, twenty-five improved, two unimproved, and in twelve the result was unknown (9). Out of twenty-two cases Alderton reports fifteen cures, four improved, and in three no improvement. The hearing was made better in thirteen, remained about the same in five, made worse in two, unrecorded in two (10). Schroeder reports fifty per cent. of cures in public practice among the poor, and eighty per cent. in private cases. The hearing was improved in sixty-five per cent. of these cases, unchanged in twenty-two per cent., and slightly impaired in thirteen per cent. (11).

The above statistics seem reasonable and I believe represent about the percentages of cures that we may expect from this operation in these cases. The writer has had seven cures out of eleven ossiculectomies; three were unimproved and one is still under observation. Out of the seven cases reported as cured the hearing was improved in four cases, unimproved in two, and in one it was made much worse. Out of the three unimproved cases two have since had the radical operation with resulting cures.

Ossiculectomy is an ideal operation if performed early enough and is prophylactic of more serious trouble. The technique of the operation is simple. It does not endanger life or health, leaves no resulting deformity, and the patient is not confined to the house for any length of time. It leaves the hearing, in most instances, better or no worse than it was previous to the operation. I do not believe that ossiculectomy should be done

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in every case of chronic otorrhoea before resorting to the radical operation, but if there are no urgent symptoms demanding complete exenteration the simple operation should be done first and followed by thorough after treatment for a reasonable length of time. Many failures following ossiculectomy are due to lack of thoroughness in operating and inefficient after treatment. It is to be remembered, too, that a completed cure does not always follow the radical operation and it is not the panacea that some of its advocates would have us believe.

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THE RADICAL OPERATION.

A. R. AMOS, M. D., DES MOINES.

This operation, reaching backward only a few years to the time when it was merely a perforation into the mastoid antrum to secure drainage of pus, has advanced to a position as highly specialized as any in surgery. A great impetus was given to its study within the past decade by that celebrated German investigator and surgeon, Dr. Stacke. It was following the then remarkable reports of an operation which received his name that the Americans began to study in earnest the new methods and since that time much work, both with pen and knife, of a very high character has been undertaken in our country. Foremost among these is that young, brilliant and enthusiastic operator, Doctor Dench, of New York. While the earlier operation sought chiefly to secure drainage, the later aims at the exact localization of the source of the pus, and the removal of every trace of its cause. Hence, I use advisedly the word "study." Every mastoid operation must follow the conditions found in each ear diseased, and is in a measure an exploration into unknown conditions. This study begins the moment the chisel begins to perforate the bony cortex, and ends only when the last bit of necrosed structure is removed from the mastoid and tympanic regions. It is above all the operation that yields to the surgeon's technique by an intimate knowledge gained, not not only from previous experience, but from point to point as the work in a given case progresses. There is a wide difference between this and soft tissue surgery, where often to secure drainage from suppurative cavities is all that is needed. Here necrosis requires other than general soft tissue surgery in a structure that is almost wholly bone, and perforated, too, by channels giving easy access to most dangerous regions of infectious material.

What is meant by the "radical operation?" Its simplest form is antrectomy, or opening of the mastoid antrum and the removal of the mastoid cells, or as well the petrous and squam-

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ous cells. The farther elaboration of the operation adds atticotomy, or opening of the attic of the tympanic cavity, which consists in removing its covering as well as the bone covering the aditus or passageway connecting the attic and the antrum. This done, it becomes easy to remove the ossicles as well as any collections of cholesteatomatous masses, or necrosed bone, and enable the dressings to be applied to the attic, the aditus and the eviscerated mastoid antrum and cells. In cerebral complications which will usually be found in the middle fossa, having gone this far, we are in very easy reach of this fossa by forcing our way through a thin lamella of bone forming the roof of this common space. This is known as the tegmen, a thin plate of bone easily penetrated with a probe, and through openings in which the cerebrum has become involved. The cerebellar fossa may likewise be penetrated by breaking open the wall separating the posterior wall of the antrum from posterior endocranial surface of the petrous. In sinus thrombosis the lateral sinus may be easily reached by perforating the upper posterior and deep wall of the antrum The opening may then be increased until sufficient, through which to remove the infected clot.

What are the dangers to be avoided? They are chiefly three: the semi-circular canal, the facial nerve, and the lateral sinus. Wounding the semi-circular canal is not so serious as to be a profound consideration, so that it may pass. Besides, fair technique will leave it unmolested. The facial is more serious and becomes in the Stacke, where the overlying wall of the attic and aditus is removed, a matter of most serious consideration and solicitude. The lateral sinus is in danger only in the primary step of uncovering the antrum, and must if possible, be avoided. To uncover it is not a serious matter, to open it will cause anxiety. It is not probable that any man who has made the antrectomy a considerable number of times, especially in chronic mastoiditis, or for the cure of chronic otitis media, has in every instance avoided opening the sinus wall. The hemorrhage is easily controlled and ordinarily without untoward manifestations. The most serious feature becomes the interruption which the tampon may present to completion of the operation. When the accident occurs, the opening should be at once tamponed, and if

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possible in such a way as to enable the work to proceed. If this is not possible and a satisfactory result cannot be assured without farther interference, then delay the matter for two weeks when the sinus will be found well closed. It is possible to enter the middle fossa by going too high, or in case of a low lying middle fossa. The accident will be easily recognized by coming upon the dura, and should call a halt in that direction.

To avoid these dangers, and yet do the work before us, how shall we proceed? The first step after shaving and cleansing the operation surface, is to incise the skin, aponeurosis, muscle and periosteum down quite to the bone. Most operators prefer to make this in parallel course with the retro-auricular fold or grove, and just a trifle behind it. The incision in the major undertaking begins near the mastoid apex and extends in a crescent manner above the auricle and well around to the temporal fossa. We must remember that a part of the auricle covers the antrum, and to uncover this alone requires that it should be displaced well forward. This completed and the vessels secured, the periosteum is stripped forward to the margin of the bony canal posteriorly and superiorly, and backward to the squamo-mastoid suture, where it becomes closely adherent to the bone, a fact of value since this is a point beyond which the chisel should not go. Above, the surgeon will recognize the supramastoid ridge, which lies usually directly over the lowest level of the middle fossa, and hence below which the surgeon must work. Now, where shall we make our attack in order to reach the antrum in safety? Below the origin of the supramastoid ridge, and above the posterior-superior quadrant of the bony auditory canal, is a small spine of bone. This should be sought and studied carefully, as it is the most important landmark lying directly in a horizontal line with the antrum in all persons approaching the adolescent age. In young children this landmark is not developed and loses its value as a guide.

The first incision which is to form the upper wall of our opening should be above a horizontal line with this supra-meatal spine and its anterior margin just a couple of m. m. behind it. Be careful not to approach too near the auditory canal for the risk of wounding the horizontal ridge of the facial. The posterior

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edge of the opening should, on the other hand, be guarded, fearing the sinus. A good rule, as the chisel penetrates deeper and deeper, hug closer and closer to the posterior osseous wall of the canal. A probe passed into the canal will be a guide to the proper course. The antrum will be reached at a depth of from two or three m. m to two and a half c. m. except in acute primary cases when it may be found already open. In this latter class, the bone is broken through below the antrum in the mastoid cells. To open the antrum it may be only necessary to use a gouge to break away the overlying plate of bone. Ordinarily the chisel may better be employed in the usual manner. Here the De Vilbiss may be useful as it is also in uncovering the mastoid cells after penetrating the antrum. The cells are then curetted and search made for the posteriorly lying petrous cells and those anteriorly above the auditory canal, the squamos, disease of which will easily infect the middle cerebral fossa, lying so close to the thin and fragile and sometimes membranous tegmen. A probe may now be made to penetrate anteriorly and above in the deeper part of the antrum, through the aditum into the attic.

This may be as far as we shall care to go and we are now ready for irrigation and dressings.

These will be acute cases, occurring from acute middle ear disease in ears previously sound and where we hope to save the tympanic membrane and ossicles. Indeed, if at this point, having previously performed ossiculectomy, we are quite sure that the attic is no longer the source of disease, we may and should proceed no farther.

Of late, however, and since the discovery of the procedure which has been given the name of Stacke, many more and wider indications are met. A large class of chronic middle ear disease incurable by ossiculectomy, or this combined with antrectomy, is now successfully managed. In these there remains diseased bony walls about the aditus or attic, or possibly fragments of the incus, not gotten by the ossiculectomy, which is discovered only by uncovering these chambers. Consequently, the Stacke operation is being more and more frequently performed, and is now almost synonymous with the term "radical operation." This is

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best performed as follows: with a fine elevator, separate the soft tissues of the inferior posterior and superior walls of the auditory canal away from the bone, down to near the tympanic membrane. Then with a fine bistoury, sever this much of the canal on a plane with the membrane. A strong suture may now be passed down along the canal from its outer opening and made to appear below when it is drawn out through the inner opening. With this looped about the auricle the inner end of the membranous canal is drawn outward and forward. The promontory of the middle ear or the fragmentary membrana tympany is now in view. The remaining portion of the inner end of the soft tissue of the canal is severed and an elevator used to detach this wall also. Finally the canal is entirely denuded as found in the bare skeleton. A few taps of the chisel cuts away the overhanging rim of the attic forming the inner end of the superior wall of the canal, which exposes the attic. A curved director is passed into this and along the course of the aditus it reaches the antrum, with this as a guide to protect the facial nerve and the semi-circular canal. The intervening bone of the posterior wall of the canal is removed down to the director, and we find the auditory canal, the middle meatus, the attic, the aditus and the antrum, as well as the exenterated mastoid process, in one common cavity, all open to free inspection. Fragmentary ossicles may now be searched for and removed, necrotic tympanic membrane cut away and any necrosed bone freely curetted. The tympanic floor will also be denuded of its mucosa and encouraged to granulate with cutaneous epithelium.

Finally, the suture is removed from the membranous ring of the canal which you will recall has been entirely withdrawn from the bony canal, its posterior wall is slit open to the auricle and each flap, an upper and a lower, brought into the posterior opening of the mastoid process, where it is stitched to the integument and the posterior wound altogether closed. The wound is packed in front of the auricle through the canal with iodoform gauze and a pad and bandage placed in position. Time, from one to two hours. There are a number of modifications of this operation. One of these consists of merely an atticotomy in which the antrum is not opened nor the posterior canal removed.

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The projecting attic wall is alone chiseled away to facilitate removal of ossicles and curettement of attic.

Jackson, of Pittsburg, has recently described an operation where, after opening the antrum he merely detaches the soft tissues of the canal from the posterior-superior wall and pushes them forward with the membrana tympana. Then introducing a probe into the aditus he chisels away the posterior wall of the canal, uniting the attic and the antrum and uncovering the aditus. This enables him to inspect the attic and curette its walls. The membranous canal is dropped into place again and the dressings placed as in an ordinary antrectomy. The advocates of Stacke claim advantage in rapid healing; Jackson finds as good results by his method. I have performed it with satisfaction.

Some late advocate advises no tamponade of antrum after the second dressing, at the end of nine days. He finds the wound fills much more rapidly and equally well. By these procedures, nearly all cases of otitic disease, with or without mastoid involvement, may be permanently cured. In chronic otitis media, incurable by other means, whether there be mastoid involvement or not, the operation is entirely warrantable and should be advised. Only, however, after simpler means have failed. To fly indiscriminately to the major operation means the loss of one of the finest arts of the aurist: the diagnosis and treatment of otitis media without subjecting a patient to the risk of major surgical procedure.

Discussion on the Papers of Drs. Lapsley, Gratiot and Amos.

DR. C. M. ROBERTSON, of Chicago.—*Mr. President:* There is very little left for me to discuss, as the subject has been pretty well gone over. There are a few points, however, that I would like to call attention to, and the first is regarding the statement made by Dr. Lapsley about the use of peroxide of hydrogen and syringing. I do not think Dr. Lapsley meant to say what he did, namely, that he uses peroxide of hydrogen before he has syringed the ear. I think he meant to say that he syringes the ear before he uses peroxide of hydrogen. It is dangerous to use it in any cavity, whether it be the ear or other organ, in which

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there is pus, before the amount of pus is reduced to a minimum. The decomposition of pus by peroxide of hydrogen becomes so active that the material may be disseminated in places where we do not want it to go. Therefore, we should syringe the ear first, and after the discharge is as thoroughly removed as possible, we can use peroxide of hydrogen, if we so desire.

The dry treatment of otorrhoea is so mixed up that I think it ought to be straightened out right here. I refer to the dry treatment of otorrhoea, meaning the old fashioned treatment by the use of powders. The dry treatment of today, as explained by the writings of most authors, is supposed to be the use of gauze or drainage treatment by gauze. We have a new dry treatment which is treatment by hot air. So we have three dry treatments, and we subdivide it. The gauze treatment is subdivided into wet moist treatment, and dry moist treatment. The dry treatment consists of syringing the ear with the use of alcohol or some other astringent, drying the ear, and putting in more or less boric acid or other dry powder. That is the treatment which is described in the text books of olden times. The dry treatment is used by ninety-five per cent. of general practitioners, and they have the idea that the more powder they put in, the better it is. In nearly all cases coming to the otologist from the general practitioner, the ears are well blocked usually with boracic acid. This is bad treatment, for the reason that a large quantity of boracic acid or any other powder acts as an impediment to the escape of discharge, so that you can have a damming back of the discharge in the middle ear which decomposes and you have infection in that way. In the dry treatment the powder should be put in sparsely, just enough to cover the parts, the same as you would put salt on a piece of meat. The tissues should be coated with a little powder, and never should enough powder be used to cover over a perforation.

The moist gauze treatment consists in syringing the ear with peroxide of hydrogen, drying the cavity, and then using gauze after the cavity is dry. The dry gauze treatment consists of mopping out the ear with pledgets of cotton without any syringing whatever, and then the insertion of gauze drainage. The hot air treatment, or the application of superheated air, is used for

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the purpose of getting rid of as much moisture as possible, with the idea in view that microbes grow much better where there is heat and moisture than where there is moisture alone.

In a paper presented by me three years ago, I gave a report of three hundred cases of otorrhoea treated by the gauze treatment without syringing. There are certain cases in which the gauze treatment is applicable, while in others it is not suitable. Where we have a muco-purulent discharge or purulent discharge from the ear, especially with an odor which is significant of decomposition of pus, syringing is all right; but where we have a serous or sero-mucous discharge from the ear, there is no use in syringing. In these cases mopping out of the ear with dry pledgets of cotton, with the addition of gauze drainage, is all that is necessary. It is unnecessary to use any medication whatever, but simply make use of pure drainage. Where there is decomposition of pus, attended with odor, you must get rid of that odor, and when you have done that you have gotten rid of the pus. As soon as there is decomposition of the pus there is odor. I do not think it matters very much what plan of treatment you adopt in some of the cases. There is a class of cases of otorrhoea in which there is not much discharge. There are others in which there are small perforations, may be a large perforation, with a small amount of discharge, and this discharge is a ropy, bloody, viscid sticky discharge which usually comes down from the attic of the tympanic cavity. These cases are nearly all significant of caries of the bone, and in the first place, we have caries as usual in the incus, on account of the very modest blood supply of the incus. We can have by pressure a solution of the mucous membrane, or by some inflammation in the cavity itself have a cutting off of the supply of blood from the incus, and necrosis follows. In the first place, we get necrosis of the incus, then in the head of the malleus; secondly, in the tympanic ring. We can have sometimes necrosis of the inner wall of the promontory, but this is the last place we have necrotic tissue. We have in these cases a clear, ropy, viscid discharge; we have adhesion of the membrane to the promontory or inner wall of the cavity, with shutting off of the attic of the tympanic cavity. These cases should be

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operated upon, because where there is much discharge of mucopus or a purulent discharge, very nearly all of them recover after operation. I don't believe anyone has ever seen a case attended with this ropy, viscid discharge that recovered without an ossiculectomy. These polypoid granulations must be removed. The snare is used a good deal in the East. I am not in favor of using chromic acid in any part of the body if we can employ anything else. It spreads on the mucous membrane; it causes damage, and it is better to use some other acid, such as trichloracetic acid, or you can use a hot wire, or pure or absolute alcohol, or adrenalin, which is just as efficient as alcohol, and is much nicer to use. The first thing to do is to make a culture where there is a discharge in the ear, and then we will know what we have to deal with. If we have nothing but staphylococci, it is a simple matter. If we have streptococci, we are confronted with a different proposition in regard to treatment. The treatment will largely depend upon what kind of a bug we have to combat. In all those cases in which we have a degenerated drum membrane we should enlarge the opening and institute drainage. If we have a small hole through which pus is escaping we should make a larger one in the drum membrane, so as to get more efficient drainage. Nearly all of these granulations, especially the granulations from hypernutrition of the mucous membrane, will disappear with the use of two or three aplications of adrenalin.

In a case of serous discharge, unattended with offensive odor, or no decomposition, use pure and simple drainage. On the other hand, in a case in which there is decomposition of the discharge, the cavity should be washed out so as to get rid of the pus. You may use peroxide of hydrogen if you wish. That is only one method of getting rid of the discharge; but you can do just as well with a probe and pledgets of cotton, then use astringent medication, with drainage. In another class of cases, where there is necrotic tissue, you must get rid of the necrotic tissue if you wish to get rid of the discharge.

Dr. Harold Bailey, of Charles City.—I have thoroughly enjoyed listening to the reading of these excellent papers, and the discussions following. The treatment of chronic otorrhoea

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covers a class of cases that are of only too common occurrence; a class of cases the therapy of which is almost as varied as it is tedious, and often only too unsatisfactory; a class of cases in which it is often difficult to determine where the medical treatment leaves off and the surgical begins.

As regards the use of hydrogen peroxide, I consider it a valuable, but in many cases a dangerous, practice. In those cases where the suppuration is limited to the tympanum, with a large perforation, or with almost total destruction of the membrana tympani, where the provision for drainage is ample, I believe the use of peroxide of hydrogen is safe, when used after first removing as much of the pus as can be done by the use of the swab or the syringe; but I do not consider that it is in any way preferable to many other antiseptics. Where we have caries involving the walls of the tympanum or extending even farther into the adjacent cells; or where the perforation is small and insufficient to admit of free drainage, in such cases I consider the use of peroxide as contraindicated. The prognosis as regards time and an ultimately good result, under medical treatment, may be determined, in a great measure, by the size and location of the perforation. With a large perforation in the posterior inferior portion of the drum, when uncomplicated by caries or cholesteatoma, a cessation of the discharge in a comparatively short period can be expected under antiseptic treatment. When the perforation is situated over the incus and of small diameter, I believe the condition is more serious, as in the majority of such cases there is coexisting caries of the incus immediately beneath. In a third class in which the perforation opens into Prussac's space, I consider the condition even more serious, and the prognosis under medical treatment bad.

In the more favorable cases in which the discharge grows steadily less and finally ceases, with no recurrence for perhaps weeks, months or even longer, we have no assurance that the patient is cured. On the contrary, it is only too often the case that the discharge eventually recurs, or the suppuration extends in other directions, and appears as mastoid inflammation or even more serious cerebral complications.

The treatment of granulations, or polypi, as they are only

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too often incorrectly called, complicating suppurative otitis, as a rule affords no great difficulty. Personally, I prefer the use of the snare or sharp spoon to the methods of cauterization. The occurrence of granulations can, as a rule, be considered as manifestations of the existence of caries of the bone, from which they spring, and this fact should be taken into consideration in their treatment.

In those cases of chronic suppurative otitis requiring a radical operation, I believe the Stacke operation, or some modification of that operation, will prove most satisfactory. That operation which will most thoroughly remove all pus, granulations, cholesteatoma, and debris, which will eradicate the necrosed bone, and which will provide most efficient drainage in the after treatment is the operation to be commended. This is effectually accomplished by the Stacke method. It does not always entirely eradicate the discharge, but it provides free drainage for the attic, antrum and tympanum, and converts these three recesses into one smooth-walled and easily accessible cavity, and by so doing reduces to a minimum the dangers of future secondary cranial complications. It is for these reasons that it is with me the operation of choice.

DR. L. W. DEAN, of Iowa City.—The question seems to be in connection with these cases of otorrhoea whether we shall use astringents like nitrate of silver, or one of the various forms of dry treatment, or to decide whether we shall treat the ear with one of the various forms of treatment, or perform ossiculectomy or curettement, or both together, or whether we shall go ahead and perform the radical operation. Upon the proper decision of that question depends the amount of time that the patient must waste in getting his or her ear, as the case may be, repaired, and upon it depends the danger to the life of the individual and to a large extent the amount of expense the patient must be put to in order to get rid of the trouble. All kinds of questions need to be thought of in considering these cases. We have a patient come to us with a discharging ear; he tells us that the ear has been discharging for years. In examining the other ear you may find that he has no hearing in it, and you have something added to the ordinary troubles that come with the treatment of chronic

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otorrhoea. You may find out that the patient has a slight necrosis of the tympanic cavity. You may be able to locate that necrosis, and then comes the question whether or not to perform the radical operation to get rid of the necrosis and run the risk of having the individual lose his hearing, or having his hearing greatly impaired, or whether you shall let it alone and have him keep his ear clean, or have him run the risk of the development of a meningitis or sinus phlebitis, and death. So far as I am concerned, I have recommended the removal of necrotic bone in such cases, and in several of them of that nature that I have been unfortunate enough to have under my care there has been diminution of hearing, because we had to follow the cases until there was some involvement of some of the structures of the middle ear. Whether that is the right course to pursue, I do not know, but that is what I have done. In three cases we succeeded in stopping the discharge from the middle ear. Dr. Amos made the remark, if I understood him correctly, that we performed the radical operation in some cases, and yet the discharge continued for years afterwards. That may be, but it is no argument against the radical operation, because I believe the discharge will continue when the necrosis is such that there is too much dead bone to remove without running the risk of destroying the life of the patient. I believe in such cases I would go in as far as I can until I got into the neighborhood of the middle ear and to the petrous portion of the middle ear and beyond, if possible. One does not feel like curetting in that portion of the temporal bone, especially when he gets beyond the facial nerve and beyond the semi-circular canal, and a good deal will depend upon drainage, and if dead bone is not removed, the necrosis will keep on spreading. I do not know whether there is serious meningeal trouble following such operations or not, but I do know that the discharge may continue for a number of years. In other instances, the discharge has continued for a year under the use of all kinds of astringents.

As to the method I pursue in these cases, it is this: A patient comes into my office with possibly total loss of hearing in one ear. He may have a discharge from the ear. Now, the thing to do in such a case is to make a complete examination,

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and I take three or four days for that examination. The first thing I do is to syringe the ear, wash it out. I do not use peroxide of hydrogen, because I think I can do more with cotton wrapped on the end of a probe. I syringe the ear out with cotton, dry it. syringe it out again, and dry it again, and have the patient come back in the afternoon or the next morning, when this is repeated. I feel then that I have gotten the ear pretty well cleaned out. I watch the discharge that comes from the ear, and if, as Dr. Robinson has said, it is of a ropy, viscid consistency, I consider the advisability of curettement or ossiculectomy. If I get cholesteatomatous masses from the attic, and think that the attic is involved, I think of the attic operation. If I find a slight discharge from the ear which is not ropy, then I advise the patient to take six weeks' treatment, and I treat the patient by the dry method, cleaning the ear out thoroughly, and packing it with gauze, and cleaning it out every day with cotton wrapped around the end of a probe, and packing it with gauze again. If the discharge is local, there is something else that has to be done, and I find out the condition of the tympanic cavity. I look for polypous granulations. The doctor has said that if these are present, we should advise curettement.

I do not know that I have ever had satisfactory results from snaring or from removing granulations with the cautery. Perhaps it is because I have not resorted to this method often enough. I advise curettement if I find granulations present; but if the discharge is foul-smelling, and there are not any granulations, I insist upon examining the tympanic cavity. I go in with a probe, and I find in almost every case by applying a local anaesthetic I can examine the tympanic cavity in a way that is satisfactory. I use chloroform, and under chloroform anaesthesia I can find out what is there. If I find necrotic bone in the attic, or if the posterior wall of the tympanic cavity is necrotic or the inner wall to any great extent, I recommend immediately the radical operation. If I find necrosis of the small bones of the middle ear, and not solid bony walls, I advise ossiculectomy, and with it I would do curettement. In those cases where, after treating them for six weeks, and I have not been able to find any dead bone, if there is still a discharge from the

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ear, I do not advise ossiculectomy or curettement, but the immediate radical operation.

I have still another procedure I sometimes carry out. A man comes into my office from the farm; he has not very much money; he has had a discharge perhaps for a number of years from his ear, but I am not able to find any dead bone. That man cannot afford to waste the time necessary to take a six weeks' treatment; he would rather have the radical operation performed, and have the ear cleaned out and get away. The patients are out of the hospital on the second or third day, so that they can walk outdoors, unless there is some serious condition at the beginning of the operation, as involvement of the meninges or of the lateral sinus. The operation in itself is not in any sense dangerous. If I have a patient who is in a hurry, if he is in such a condition that he cannot take time to go through all of this treatment, I advise him to undergo the radical operation at once. That is the procedure I usually follow out.

Dr. W. B. Small, of Waterloo.—I do not believe we are very far apart in the discussion of this subject. There are cases that do very well with dry treatment. There are cases that get well with the wet treatment, and there are still other cases that get well after ossiculectomy. Other patients recover after the radical operation. Of course, there are some patients who do not get well after any one method of treatment has been tried, or all of them. The question is as to how long we shall keep up treatment in a certain case before we do an ossiculectomy or resort to the radical operation. This is a hard question to decide, and I do not believe that anyone can tell me, nor can I tell anyone else, how long treatment should be kept up. It depends very largely upon our individual judgment in the matter. We have to decide this for ourselves. I am not in favor of making the radical operation in every case. I believe where we have a case of necrosis the safe thing to do is to perform either ossiculectomy or the radical operation. This is a safe course to advise. I recall to mind two cases, neither one of which would permit the radical operation which I advised. These patients had consulted other physicians who had advised the radical operation, and they did not want to submit to it. They returned

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for treatment and said they did not want the radical operation; that they were willing to be treated just as long as was necessary. I did not believe that either patient would get well without a radical operation, and I so stated to them. They were both cases in which the attic was involved, and I am inclined to think there was more or less involvement of the antrum also. I used the attic syringe, syringing it out thoroughly and drying it thoroughly, afterward using the intra-tympanic syringe, with pure alcohol, and having the patient recline on the opposite side and leaving the alcohol in from fifteen minutes to half an hour, after which I dried it out. I found the external canal remained open, so that I could get evaporation every ten or fifteen minutes, then use a pledget of cotton to close the canal. I treated those patients daily, one for eighteen months, and one for over a year, and both recovered. It is not often that we can do that; it is not often that we can get patients to come to us so frequently. In one case I believe it was six months before I was able to notice any indication of improvement, and it was three or four months before I noticed a particle of change. One patient has gone on for almost ten years since treatment, and the other about six years, neither one of them having had any trouble since. One patient was a boy sixteen years of age, and the other a young man of twenty.

I wish to say a word or two in reference to the importance of using chromic acid on granulation tissue. I have never had any agent that gave me as much satisfaction as chromic acid has on granulation tissue, when properly and carefully used. It is the best agent I have ever employed for that purpose.

DR. R. M. LAPSLEY, of Keokuk.—I am sure the members of the Society would like to hear from Dr. Casey A. Wood in reference to this subject before the discussion is closed.

DR. CASEY A. WOOD, of Chicago (by invitation).—I do not know, Mr. President, that I am competent to stand up here and discuss intelligently otological subjects, although I do a little ear work now and then.

There is one thing I would like to say which directly has to do with a grave question when we first see the patient, and that is, the patient will ask you in regard to the prognosis and

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what you intend to do for the relief of the one symptom that gives him so much trouble, namely, otorrhoea. It is the only symptom. After all, it is very much like the symptom of headache; it is the one thing we have to deal with, when it is marked and severe. I would like to say, that I can think of one class of cases that will probably be cured by simple means. I refer to that class of cases that are well trained.

There is one thing that has not been mentioned this evening, either in the papers or in the discussions following them, and that is drainage into the back part of the nose through the Eustachian tube. If, on a test, in syringing water passes readily into the naso-pharynx through the Eustachian tube, I consider it a favorable sign. Those are the cases, assuming that the necrosis or caries of the bone is not too far advanced, that are likely to get well. If in these cases you have a large opening through the drum-head, it is all the better; if there is no drum-head there at all, so that you can feel that the bones have been removed, I would advise you to treat such a patient from one to three months, because there is a fair chance that the disease will be eradicated; you will not have many of them relapse, and if they do relapse, they will not bother you much. By so doing you may be able to avoid operative intervention. But where there is disease of the antrum, if you are satisfied there is diseased bone, one is not justified in temporizing at all, but you should advise operation at once, and if less radical measures should fail, I certainly think the radical operation ought to be done. The main reason why I should hesitate to do the radical operation is not because the patient is confined to the hospital so long, but because the individual cannot go about his business after the radical operation; at any rate, he cannot go around with large dressings on the side of his head. As a matter of experience, we find that from three to six months' time is lost from business or from the occupation of the patient who is operated by the ordinary Stacke-Schwartz method of operation. It is a serious matter to suggest this operation to a patient, if for no other reason than the great loss of time which it involves. Of course, that must be weighed against the liability to death and continuance throughout the life of the individual of this offensive and disagreeable discharge.

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DR. LAPSLEY (closing the discussion on his part).—I only wish to say a few words in closing the discussion. Dr. Robertson referred to me as having made a mistake in regard to syringing the ear, etc. I did not make the statement exactly as he brought it out. However, I frequently syringe the ear, apply dioxogen, and then syringe the ear again, and thus far I have not seen any bad results from this method of procedure. I cannot take up all of the little points that I would like to speak about. There are disagreements about the little points. Many things have been mentioned concerning which we disagree more or less, and particularly with reference to the treatment of otorrhoea. No one method of treatment of this condition has been demonstrated to be perfect. Every case of otorrhoea should be considered as a law unto itself, more so than in almost any other disease. A great deal depends upon the location of the perforation, and as to whether some of these methods of treatment should be tried at all or not. Personally, I do not make much use of chromic acid. Each case must be considered individually and studied by itself, and treatment instituted accordingly. We have not agreed in regard to many of the points presented, and I do not care to consume any more of the time of the Society to bring out any more points.

DR. AMOS (closing the discussion).—The chief and grand purpose of getting into the antrum is that this is our guide throughout in completing the radical operation. After we get into the antrum, we feel that we are on safe ground, but until we do get there we are at sea all the time, so that the first thing to do is to get into the antrum. We should not retard the progress of the case by making unnecessary removal. With reference to chipping away the superficial plate of bone, the German surgeons do this systematically. My rule is to use a chisel, breaking the shell of bone from within out, or using the De Vilbiss cutting bone forceps. This cuts away all of the bone overlying the cells which lie behind, and which is as far as we dare go. I would call attention to the squamous cells lying in front of the superior wall of the canal—a very important position, because it lies at the inner wall and frequently is the infecting source of the brain and the middle fossa. These cells should be opened as uniformly as possible where there is active and general disease.

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Section of Surgery.

SOME PHASES OF CRANIAL SURGERY.

ADDRESS OF CHAIRMAN GILBERT G. COTTAM, ROCK RAPIDS, IOWA.

Without attempting to cover more than a mere fraction of the ground now occupied by cranial surgery, I wish to invite your attention to a few points which may prove of interest at this time.

We realize today, more than ever, that the complex anatomy and the incomplete knowledge of the physiology of the brain, coupled with the element of uncertainty of diagnosis and operative result, all conspire to make the study of this branch a most perplexing matter, and these features also explain why more headway has not been made and why the field is an unattractive one for the dilettante or the sensationalist.

To learn what to unlearn has, indeed, been one of the hardest problems for investigators to solve and the results have become evident by the fact of there remaining more shattered ideals in the form of rejected fundamental teachings and abandoned operations than in any other branch of surgery.

This, however, is true progress. The utter refusal of the present age to be bound down by fallacious tradition has produced remarkable changes within the generation and promises well for the future, but we must not blind ourselves to the fact that in brain surgery especially much that we are prone to regard as proven and permanent today may tomorrow be ruthlessly condemned. The logical deduction from this is that the work of today should rest on a surer foundation and that we should profit by the mistakes of yesterday.

If we carefully analyze the history of the recent past, to say nothing of more remote times, we can not fail to be impressed with one especially notable fact, namely, that experimental procedures unsupported by a sound pathology have invariably been unproductive of results and, *per contra*, wherever pathological conditions have received a correct interpretation, there have

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followed the permanent advances in cranial surgery. Let me cite examples. Of the pathology of epilepsy we know nothing, but when the era of clean surgery was inaugurated and cerebral localization began to be a little understood it was thought well to revive the ancient operation of trephination for this condition, removing the so-called epileptogenic center in the true Jacksonian, or the depressed area in the traumatic, cases. The immediate results were encouraging, but it has come to be known that almost any operation on the cranium will cause temporary improvement in an epileptic, only to be followed by relapse later, and such proved to be true in this connection. Then a flank attack was made by Alexander, of Liverpool, who, proceeding on the theory that an increased blood supply was responsible for the cortical irritation sought to diminish it by ligation of the vertebral arteries. This also failed. Later, Chipault, assuming that cerebral anaemia was the causative condition, advocated excision of the cervical sympathetic ganglia, for the purpose of augmenting the supply of blood to the brain and this, too, after attracting some attention, fell into disrepute. The three-year limit has been the Waterloo of all operations for epilepsy up to the present time and the results show that it is useless to proceed farther until we know something of the real nature of the affection itself. This applies to microcephalus, hydrocephalus, idiocy and general paralysis of the insane, the pathology of which we either know nothing of or else have learned enough about to indicate that the operations devised for their relief were based upon faulty deductions and have therefore very properly been abandoned.

It may, then, very pertinently be asked whether our incomplete conception of the pathology of the central nervous system constitutes the only barrier to progress in its surgery and we must admit that there are other factors to be reckoned with. Of great importance is the matter of cerebral localization, upon which so much light has been shed in the last thirty years and of which so much remains yet to be revealed. It is true, that the function of a large part of the cortex has been accurately mapped out in the physiological laboratories. It is also a fact that comparatively little of the knowledge so acquired is

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available for practical purposes and to harmonize the pathological conditions with the clinical manifestations is one of the unsolved problems of the present which we hope the future will explain. It is coming to be recognized that injuries severe enough to produce focal symptoms at all are generally accompanied by sufficient laceration of the surrounding and distant brain substance, with resultant hemorrhages of various degrees, to render a localizing diagnosis impossible. Krönlein says:

"In complicated cases without history the surgeon is glad to make a diagnosis in general, or to know on which side to trephine." *

In abscess or tumor cases the same difficulty may be met with, owing to the very gradual enlargement of the lesion and consequent adaptation of the brain to the increased pressure. Irradiation fractures, causing hemorrhage on the opposite side from that upon which the injury was inflicted—the modern view of the old *contre-coup* theory—may also prevent a localizing diagnosis by the fact of total paralysis being thus produced. A typical instance of this came under my observation ten years ago. The following is a brief history of the case:

A heavy, middle-aged teamster fell from his wagon, striking the posterior part of the right lateral surface of his head upon the hard ground, sustaining a depressed fracture of the posterior lower one-fourth of the right parietal bone, becoming totally paralyzed and comatose forthwith. A large flap was turned back and the fragment elevated. There was slight temporary relief, but the grave symptoms soon recurred and death ensued within forty-eight hours after the injury. At the post-mortem it was found that the fracture had followed the lambdoidal suture around the back of the skull to the opposite side until it reached the asterion, when it divided into two branches, the upper of which terminated just anterior to the zygomatic tubercle, the lower again dividing into two branches which ended in the mastoid process. On opening the skull it was found that the left lateral sinus had been ruptured by this fracture, producing

*—Quoted by S. C. Plummer in "The Hartley-Krause Flap in Hemorrhage from the Middle Meningeal Artery." Annals of Surgery, Vol. XXXVI, p. 597.

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a large subcranial haematoma which extended as high as the superior temporal ridge, while under the dura of that side was another large accumulation of blood, covering the entire hemisphere of the brain.

Lesions in the frontal cortex are devoid of special localizing symptoms, but suppuration in this region may be accompanied by marked cachexia, of which the following case is corroborative:

A. B., a boy aged seven, was kicked in the right frontoparietal region by a horse, receiving an open fracture close to the pterion and becoming immediately comatose. The wound was stitched and dressed antiseptically by the attending physician. Coma continued for two days. On the third day measles developed. Recovery ensued without further incident until four weeks after the accident, when the patient began to complain of frontal headache, vomiting at times. The temperature became irregular and occasionally attacks of spasmodic convergent strabismus were noted. There was marked emaciation, with anaemia. Seeing him in consultation at 3 a. m. five weeks after the receipt of the injury I found the temperature 98°, the pulse 110; patient restless, but rational and complaining of frontal headache. He was much emaciated. There was no ocular irregularity and the fundus was not examined. The site of injury was tender on firm pressure; the original wound in the scalp was entirely healed. On turning down a large flap a fragment of bone measuring ¾-inch by ½-inch was found driven into the brain substance and under it about two drachms of pus, which spurted out with some force on removal of the fragment. The opening in the skull was enlarged with rongeur forceps, the flap replaced and efficient drainage provided for. The patient succumbed to pulmonary edema eight days afterward, and no autopsy was performed.

These cases are simply types illustrative of the fallacious import of localizing symptoms. Realizing this, it becomes necessary to consider the only other available method of diagnosis—exploratory operation—and I think that it will be freely conceded that the development of our present technique makes this a much less formidable undertaking than heretofore. By means

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of the osteo-tegumentary flap it is possible to make the necessary investigation of the suspected area and afterward secure a satisfactory readjustment of the anatomical relations involved. If necessary the entire motor area of one side can be explored through one flap without compromising the subsequent integrity of the coverings. The methodical exploration of the brain for fluid can be carried out either by Fenger's cannulated sounds, or better by the use of a thin, slender spatula, which may be inserted in every direction and is equally serviceable to detect the presence of new growth or fluid. It is well to observe, in this connection, that chemical antiseptics have no place in brain surgery, but the most rigid asepsis is even more essential than in abdominal operations, where we have a peritoneum to cover a multitude of sins. Prolonged exposure of the brain, too, is likely to prove disastrous by the production of profound shock and must always be avoided. The recent work of Horsley and Macewen in the removal of growths in two stages affords a valuable suggestion for the prevention of shock. If we read between the lines of many reports of cerebral operations we can not but conclude that the patient's welfare would often be better subserved did the operator content himself with trying to do less. I believe that this applies with especial force to the management of open, or compound fractures. The objects to be accomplished are: (1) limitation of infection, (2) haemostasis, and (3) relief of pressure. Now, if this can be done, as is frequently the case, through the original opening, what is to be gained by systematically performing trephination in each and every case, as so many text books direct? This point was brought forcibly home to me in a case which had to be treated in very unfavorable surroundings, causing me to hesitate over the question of doing a radical operation and finally deciding in the negative, although the injuries were such as under ordinary circumstances are usually taken to warrant operative interference. The history of the case is as follows:

Mrs. M. R., aged 25, was struck several times on the head with a dull-edged hatchet, rendering her unconscious at once. The head being shaved I found four separate and distinct open, depressed fractures, one being situated on the sagittal suture,

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midway between the glabella and inion, another about one inch to the right of the external occipital protuberance, the other two close together near the left squamo-parietal suture. The fragments were driven through the dura into the brain in every instance except the first mentioned, which was in the superior longitudinal sinus. The removal of all the fragments was done by means of a narrow bladed forceps and the edges of the openings in the skull carefully examined for depressed pieces, which were elevated in like manner. The wound in the superior longitudinal sinus bled furiously on removal of the fragment; this was controlled by gauze packing, which is the proper and only method of dealing with injuries of these vessels. The other openings were all drained without suturing. Hot sterile salt solution was employed throughout to wash away debris, etc. The patient made an uneventful recovery.

Under no circumstances should the scalp in an open fracture of the skull be stitched when such stitching interferes in the slightest degree with the freest possible drainage. The teaching of some writers that the proper practice is to convert them into closed or simple fractures at once is absolutely pernicious. Every accidental, open wound must be regarded as infected, and we have no right, in the present stage of our knowledge, to assume otherwise.

Before closing, permit me to plead for the utmost simplicity of technique in all operative procedures upon the cranium and its contents. There is a tendency nowadays to introduce a bewildering array of new and modifications of old appliances into surgical work, not one in twenty of them of any real practical utility. The trephine is, of course, obsolete and merits no place in a modern surgeon's equipment; its place has been taken by the chisel, the rongeur and the De Vilbiss device. With these, in practiced hands, any modern surgical procedure on the skull can be executed. They are inexpensive, can be carried anywhere and may be adapted to other purposes. They do not get out of order like surgical engines, nor break like Gigli wire saws. It is quite unnecessary to adopt Shafer's method of controlling hemorrhage from the scalp by an encircling rubber band;

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such a few vessels as bleed are better caught up at once by haemostats, which then hold down the flap by their own weight and obviate the necessity of an assistant with a retractor. Again, too, would I put in a word for the osteo-tegumentary flap, it being the simplest method of entering the skull for the relief of middle meningeal hemorrhage, growth or abscess of the brain or for purely exploratory purposes.

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DISINFECTION AND ASEPTICISM IN THE OFFICE OF THE GENERAL PRACTITIONER.

BY EDWARD HORNIBROOK, M. D., CHEROKEE, IOWA.

The recent graduate has received such thorough training in the principles of aseptic surgery that what I say in this paper may seem to him like supererogation, or "carrying coals to New Castle." The busy general practitioner who attends infectious diseases, does widwifery, some minor gynaecology and a little surgery, must be ever on the alert to escape the disasters that may result from a disregard of asepticism, and the disinfection of his person, his clothing and his office. If "perpetual vigilance is the price of liberty;" much more is perpetual vigilance the price which each of us must pay to keep our offices and persons from communicating diseases as well as surgical infection.

Perhaps I can convey my ideas of the risks which we all incur by giving the details of a single day's work in my own practice. On the 29th of January last I was called to a case of phlegmonous erysipelas before office hours. The temperature was 104. My clinical thermometer is disinfected on 1 to 1000 alcoholic sublimate solution and rinsed with water before putting it back in case. I require to make multiple incisions. My knife is sterilized by running it through the flame of a match. I would have preferred a spirit lamp, but I have none with me and have not time to waste in boiling water. I see a derisive smile on the face of the gentleman I met in consultation; and he explains on being questioned that the case is already septic and therefore antiseptic precautions are entirely unnecessary. I silence him by asking if he ever heard of a mixed infection? I use the water which I had put on to boil to disinfect my scalpel before replacing it in my pocket case. Care is taken to keep my hands out of the pus and blood which escapes from the wound and to thoroughly scrub them with sublimate solution and green soap before I touch the instruments which are now in boiling water.

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When I reach the office I find a case of periostitis which needs incision. Remembering the dangers of carrying erysipelas, I remove my outer garments and hang them in a closet to be fumigated with formalin vapor. My hands are disinfected and I don a white coat and pants taken from aforesaid closet. I again cleanse my hands, this time in a sterile washbasin, and wipe them on a sterile towel. I keep a sack of small towels and gauze sponges and use a clean one every time I wash my hand, or wash any part of the person of another. The site of the proposed incision is then thoroughly cleansed, and without waiting to boil the knife I run it through the flame of a spirit lamp several times. This knife and the one I used in the morning are then thoroughly cleansed by my office helper before being returned to their cases.

When this patient is dismissed I find a woman in the waiting room who is greatly amused at my white coat and summer pants. I find she has an offensive leucorrhoeal discharge and before making a digital examination I use a copious vaginal douche, through a wire speculum, of two per cent. creolin solution. I find an offensive purulent discharge oozing from the os and conclude that I have a case of purulent endometritis to deal with. I remove the pus from the canal and mop it with creolin, full strength, before making any intra-uterine application. I do this because germs which are innocuous in the vagina and cervix are capable of setting up virulent processes when carried to the endometrium If a pledget of cotton is placed beneath the cervix to protect the vagina, the application of creolin to the cervical canal is painless. The cotton and gauze used have been sterilized and kept in jars ready for use. The instruments are given to my office assistant to be cleansed and sterilized after every gynaecological examination.

My next case is a small lipoma which requires only surgical cleanliness, which you all so well understand. While I am doing this operation three children wait for an hour in the waiting room. One of these proves to be a severe case of diphtheria. She is sent home and the waiting room closed till the next morning and the room thoroughly fumigated.

This is only such a day as any of you may have in office

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practice; and yet every case mentioned required the closest attention to aseptic precautions, or I might have carried a chain of infection from one patient to another so that no one could foresee the results.

To be able to effectually carry out these details there are certain preliminaries which appear to me to be absolutely essential. These I shall proceed briefly to summarize:

1st. There should be no carpet nor upholstered furniture in waiting room, consulting room or operating room.

2nd. All windows and doors should be open for at least half an hour after the sweeping and dusting in the morning before the office hours commence.

3rd. Wash basins should be cleansed and a drachm of alcohol burned in each while the office is being aired. And every time a wash basin is used it should be cleansed and alcohol burned in it before being used again.

4th. There should be separate wash basins for cleansing the hands and for surgical work.

5th. Nail brushes, throat brushes and camels hair brushes should be kept in wide mouth jars in sublimate solution.

6th. All towels, wash rags and gauze sponges should be sterilized and kept in sterile bags ready for use and neither should be used more than once before returning to the laundry.

7th. Gauze and bandages should be first steam sterilized and then placed in dry heat at about 400 degrees for at least half an hour, and then kept in air tight jars.

8th. No brush or applicator should be dipped into any bottle containing the solution which is to be applied to any sore or wound. The solution should be first turned into a narrow bottomed glass or porcelain vessel and what is not used should be thrown away. My own method is to burn a small quantity of alcohol in these vessels before the solutions are poured into them, and again after they are used.

9th. The soap to be used for washing hands or instruments should not be the ordinary cakes used for toilet purposes. It should be liquid or semi-liquid and poured upon the hands as required. It seems absurd to expect that a substance with such feeble germicidal powers as soap should be used to wash the

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hands after treating a case of erysiplas and the same soap used again to cleanse the site of a proposed incision or to clean the hands.

10th. Instrument cabinets should be always aseptic. I frequently see elaborate glass shelved and glass covered instrument cases. They would be pleasant to look at if their beauty wasn't so often marred by accumulations of dust. A wooden shelf in a wooden cupboard, with sterile white towels to lay the instruments upon, would appear to the man who cared more for results than appearances as more likely to fill the requirements for surgical cleanliness than the most expensive and elaborate glass cases, if these are allowed to be receptacles for dust and pathogenic germs. My own practice is to have white sterile towels laid on shelves once a week and then fumigate the cupboard with formalin.

12th. No instrument should be laid on these shelves until first sterilized. If this rule is rigidly adhered to any instrument can be safely used if first dipped in pure carbolic acid and then in alcohol or passed a few times through the flame of a spirit lamp. This consumes less time and is in my opinion quite as effective as spending twenty minutes to sterilize a scalpel or probe or needle or haemostatic forceps in emergency cases or in the busy routine of office work.

13th. Great care should be taken to disinfect any room to which infectious cases have found access, and as we never know who or what manner of diseased persons have occupied these rooms during our absence frequent fumigations should be used.

14th. Too much care cannot be exercised by ourselves lest we bring infection from the homes of our patients and make our offices foci for the dissemination of disease.

15th. All syringes and irrigators should have an antiseptic passed through them before being filled with the solution to be used, and the nozzles should be first dipped in pure carbolic acid and then in alcohol.

16th. While it is a safe surgical rule to assume that everything which is to come in contact with a wound or sore or ulcer should be first rendered sterile by boiling water or steam or hot air, yet in office work many things have to be done of apparently

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so little importance and for which so small a fee is received, that time cannot be spared for thorough sterilization. By constant attention to minor details little things can be safely done without wasting time. By always acting on the principle that no job is completed until the instruments used are cleaned and ready for use again, it is possible to do the minor surgery of office practice without any longer delay than the half minute required to pass the steel instruments through the flame of the spirit lamp, or to dip them first in carbolic acid and then in alcohol. With silk kept in sterilizing solutions, catgut in breakable tubes, sponges, gauze, absorbent cotton and bandages kept in air tight jars, we can do any minor work with almost as little delay as we did it in the good old pre-antiseptic days.

Discussion on the Paper of Dr. Hornibrook.

DR. A. M. POND, of Webster City.—*Mr. President:* It seems very appropriate for the members of this Society to have listened to this paper from the man who has just read it to us, a man who has had a vast and varied experience. There are several different sources of deriving information. We get a portion of our information by reading and studying, but the best and most telling information is what we get from our practice and our own observations.

The subject as dealt with by the essayist clearly reveals how sincere, earnest and thorough are the applications of antiseptic and aseptic technique applied in his own practice. The thought occurred to me, perhaps as never before, that our offices are really receptacles for all classes of conditions that may come within the domain of medicine and surgery, and realizing and recognizing the transmissibility of the contagion of so many of these conditions, it is very important that we take all precautions to protect our patients when they come to us that lie in our power. Dr. Hornibrook has covered the field thoroughly and well. It is not my intention or desire to make any comments upon this well arranged paper, and it would be impossible for me to do so. I wish to commend heartily the paper, and call attention to a few things that in my own practice have been a modification of the

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principles he has laid down. The importance of paying attention to carpets and upholstered furniture is apparent to all. These articles of furniture collect dust, and this dust contains pyogenic organisms possibly. We do not know that it does, but we do not know that it does not, and by having the floors of our offices covered with linoleum, or bare floors painted, it is easier to maintain a technique that approaches the aseptic technique. The class of cases with which the general country practitioner comes in contact has been very clearly pointed out by Dr. Hornibrook, who has given us the wide scope of our work. The first case he enumerated, as I recall, was one of erysipelas; following it there was a case of osteomyelitis, and then another in which he resorted to a vaginal examination. We have got to protect our patients and ourselves. Dr. Hornibrook's advice in regard to treating patients was timely and well said. We might add to it the statement of that master of technique, Howard A. Kelly, who said, "Cultivate an aseptic conscience; keep your hands clean, and be conscious of the contamination that you are liable to get, and be conscious of the fact that you have been in contact with a contaminated subject." Take all the precautions that lie in your power to restore the position of sterility.

Regarding the use of ligatures and bandages, too many practitioners are using packages of gauze and cotton put up in commercial packages. I have not the slightest doubt that these packages reach the offices of practitioners in a sterile state, but the moment the parchment paper seal is broken and a portion of the gauze for making the dressing is removed, you cannot rely on the sterility of the gauze in that package, no matter how complete your technique may be in preparing your hands and in removing the pus. I would advise you to buy gauze in bolts, and prepare it yourselves, as suggested, placed in sterilized packages of unbleached muslin bags or close stoppered glass jars.

With reference to the subject of ligatures, he speaks of the tank package. If the tank package contains enough material to make one ligature, it is all right. I doubt if you can maintain the sterility of catgut after the tank package has been once opened and a portion of it used. We have seen packages contained in tubes with rubber corks. Possibly this may be sterile,

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and possibly it is not. We do not know. We cannot afford to take chances. The commercial envelopes containing just enough ligature material to be used for one application have the redeeming feature about them that they contain sufficient for our use. They are inexpensive, and the rest can be destroyed.

With reference to the sterilization of knives, the doctor mentioned passing the knife through an oil flame or alcohol lamp. If repeated, I think this will destroy the temper of the blade. I find it convenient to use a dish into which I pour carbolic acid pure and put the blade of the instrument in this, thoroughly immersing it, and then washing it off with alcohol.

Concerning the dressings to be applied, whether the case is septic or aseptic, whether the case is one of deliberate operative procedure, or whether it comes to you in the emergency of an accident, the essayist has called our attention to the fact that if it is septic, a great many of the pyogenic organisms may be latent, or perhaps are not very active until another combination of pyogenic organisms is added to them, and then we have a mixed infection, and it is scarcely necessary for me to say to you that the hardest of all infections to combat is a mixed infection.

I wish to thank Dr. Hornibrook heartily for the presentation of this admirable paper, and I think the members of the Society are to be congratulated on having listened to it.

DR. D. C. BROCKMAN, of Ottumwa.—Dr. Hornibrook states in his paper that he takes very much better care of his office than I do of mine. He ought to do so, because he is older and has had more experience than I have (laughter). He probably does more work than I do. I only do minor surgical work in my office, and I am not able to keep my office sufficiently clean to do thoroughly aseptic work. I have a room specially adapted for such work, and I would not do such work unless I had a suitable room for it.

As to the question of contamination from carpets and upholstered furniture, etc., that was very well illustrated in my office a little while ago. I had what I thought was a nice lounge in the office. I went to the office one day and found the lounge somewhat disarranged. It was in a bad condition. I asked my assistant what was the matter with it, and he said that it was a

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little "buggy," and so we sent it to a second-hand store. It became infected, that is what was the trouble with it. We have no right to have such furniture in the office that will become contaminated with germs.

The point I want to make is this: I would caution Dr. Hornibrook, as otherwise one of these days he may get a lethal dose of sepsis by not using rubber gloves. If he put on rubber gloves he could handle his erysipelas cases without danger to himself, and with very much less danger to his patients. I want to urge the doctor to protect himself against pathogenic germs by wearing rubber gloves. These gloves are not expensive. One can buy eight or ten pairs of rubber gloves and they are easily sterilized.

Dr. E. H. King, of Muscatine.—There is one source of infection that has not been mentioned, and that is infection from the nasal secretion. In those who suffer from catarrh the nasal secretion is very free. I have seen operators stop and take handkerchiefs out of their pockets, use them, return them to the pockets and then go on with their surgical work. That is a source of infection that is liable to be overlooked. I saw a celebrated surgeon in Chicago spend nearly two hours in preparing the patient and himself for operation, and while operating he had occasion to pick his nose with his fingers, and then went on operating again. I would like to know how much the previous preparation amounted to. He was undoubtedly unconscious of having done that. There are many times when we do things unconsciously which will destroy all of our attempts at asepticism.

In regard to office work, instruments, etc., I keep aseptic knives, scalpels, etc., in my office for opening abscesses and in operating on tumor cases, and never use my general operating case for anything of that kind. I think it is a wise precaution, and that too little attention is paid to it. The general practitioner frequently has a set of instruments which he uses for all kinds of cases. Theoretically, we are unconscious of doing things that we ought not to do. It occurs to me how very necessary it is to thoroughly prepare the patient and keep the clothing free from contamination.

Dr. Hornibrook (closing the discussion).—I have little

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to say in reply. I wish to thank the gentlemen who have made complimentary remarks on my paper, and the gentlemen present for the courtesy of their attention. The title of my paper is disinfection in the office of the general practitioner. The great bulk of us are so situated that we are not so fortunately placed as is Dr. Brockman, where he can take his cases to the hospital. We are doing general work; we have to do minor surgery. Of course, we do not do major surgery in the office; but we can disseminate infection from the office; we can carry it from our patients to our offices, and from our offices to our patients. What I wish to do is to impress upon the minds of general practitioners the absolute need of as near an approach as possible to surgical cleanliness in their offices, and in their persons, and in their relations to patients.

With regard to the use of the spirit lamp or the flame of a match for disinfection, you would not do that, because it would spoil your knife, if you have other means. You may be called to see a case in the country of erysipelas where you have to act promptly; you have not much time to spare. You can disinfect your knife readily with a match, or, better still, with a spirit lamp. If you have a wide-mouthed jar of carbolic acid or alcohol, it is better to use that because it will not damage your instrument. I think the highest compliment I have ever had paid to me was given to me not by a member of my own profession, but by two ladies who came into my office requiring gynaecological examinations. I had not seen them before. I examined one of them, treated her carefully, and sent my instruments to be disinfected. I disinfected my hands, and was going back into the room again, when I heard one of them say, "What an old crank he is about his hands and instruments." Well, now, I think it is better to earn the reputation of being a crank about one's hands and instruments and have people talk about you in that way than to carry infection to a single case. (Applause). In reference to the remarks made by Dr. King, I will say that they are extremely timely and well put. Not only is there danger from the surgeon who has catarrh from blowing his nose, but there is danger from the obstetrician who has catarrh of breathing into the womb. I would not allow any man who had a

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catarrh and offensive odor on his breath to come near a patient upon whom I was operating. I have the strongest reasons for that. A gentleman in our own county, one of the best equipped young men we ever had in the county, with splendid attainments, well trained senses, well grounded in his profession, had a series of fatalities in his obstetric practice which I attributed solely to the catarrhal condition from which he was suffering. He is now dead of consumption, and I speak kindly of him. I do not think any surgeon, who values his own reputation, can afford to do any operation with the breath of a catarrhal patient or person being breathed into the wound.

As to having separate knives, the suggestion is a good one, but if you will earn the reputation of being an old crank about your instruments, any knife might do. I would not open an abscess; I would not remove an ingrowing toe nail; I would not make any incision into any part of the human body unless I took precautions to make my knife as sterile as I would if I were going to open the abdomen.

These mixed infections, as Dr. Pond has said, are the bane of surgery. They lead us into difficulty after difficulty; they endanger the lives of our patients, and conscientious men, men with septic consciences, should try to avoid them.

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DIFFERENTIAL DIAGNOSIS OF GASTRIC ULCER FROM GALL STONES.

A. L. WRIGHT, M. D., CARROLL, IOWA.

At first thought many of those present will be surprised that there should be any difficulty experienced in differentiating between gastric ulcer and the presence of gall stones in the bile tracts. This is not an ignis fatuus, but an actual clinical fact frequently encountered by every surgeon of large experience.

The close anatomical relation and the imaginative closer relation of the gall tracts and outlet of the stomach in the mind of the overworked general practitioner, often accounts for the difficulty and errors made in discriminating between the two pathological conditions. In both the pain is very severe and excrutiating, vomiting is an early symptom and often affords immediate relief in gall stones as well as ulcer of the stomach. The pain complained of is usually located in the epigastric region, and radiates through to the back, chest and abdomen. Whenever confusion occurs in differentiating the examination has been hastily made and sufficient consideration has not been given to the clinical facts and the chronological order in which they occur. More time and care must be given to the examination of our patients. Cognizance should be taken of the time and order in which symptoms appear. The general practitioner of medicine ought to have more pay for the laborious work he does, so as to enable him to better prepare, equip and maintain himself for the needs of the hour. Modern instruments of precision are high priced, but in order to be more accurate in his work and give better service he should have them.

I have met with a number of cases of cholelithiasis and gastric ulcer that were very confusing at first. A little time and patient work finally straightened out and made clear the proposition. The history of the following cases recently coming under my observation and operated upon will clear up and emphasize the point I am trying to make:

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Mrs. L., a widow about 55 years of age, had suffered for ten years from pain in the upper abdomen of varying intensity and regularity. Was told that she had some disturbance of the stomach, that every symptom seemed to point to ulcer. She always located the pain by covering the involved area with the entire hand, placing it over the epigastric region. Never noticed that the taking of food caused the pain to be more severe than before, but thought that certain things she ate gave rise to discomfort. Food containing much fat and that was rich, as she expressed it, caused her to suffer most and had been expunged from her diet with the same result, a continuance of her suffering. At first her attacks were not severe and came on when she had been overworking or had over indulged at the table, occurring with increasing frequency the attacks came on until during the past year she has hardly been free from pain. This woman had lost considerable weight during the past few months owing to the fact that she had had herself on a starvation diet. The attacks would occur any time, irrespective of what or when she ate. They would occur in the night, many hours after eating, just as often as when indulging at the table of Epicurus. Generally the more severe paroxysm of pain would be followed with vomiting and almost immediate relief. The suffering becoming almost continuous when not under the influence of a narcotic and the appearance of a transient jaundice was the occasion for my being called. The jaundice aroused the suspicion for the first time that possibly there might be some difficulty in the gall tracts to account for a part of the suffering she had endured during the past ten years. This woman was thoroughly convinced that nearly everything she ate caused her to suffer, whereas when closely questioned she was not certain about the pain coming on immediately after the taking of food, but thought there certainly was some cause and effect relation existing between the two. The fact was elicited that she would have attacks of severe pain long hours after partaking of food, in fact when she had absolutely taken nothing in her stomach. The reverse is also true, she would eat heartily and remain entirely free from pain. There were times when the freedom from suffering made her think she was entirely well. Of late years an attack of pain

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was generally followed by an elevation of temperature. The presence of blood had never been detected in the vomit. There was more or less tenderness over the epigastric region, but the point of greatest sensitiveness was just below the costal arch and about two inches to the right of the median line. The removal of sixty-four gall stones from the gall ducts relieved her entirely of her gastric ulcer symptoms.

The brief history of the next case that recently came under my observation emphasizes what has already been said and show how readily a gastric ulcer can be mistaken for a cholelithiasis. These two cases form the basis of this paper and impressed me with the thought that most of our errors in diagnosis were due to haste and not ignorance.

Mr. K., about forty years of age, a bartender by occupation. It has been his habit for years to drink large quantities of beer when at work. Had always enjoyed good health until about six months ago when his present illness began with indefinite symptoms in the upper abdomen. There was always a feeling of unrest in the stomach except immediately after vomiting, which occurred several times a day. The pain began as soon as food was taken into the stomach. The taking of liquids would excite pain, but it was much more intense when solid food was taken. This continued until he emptied his stomach, from one-half to one hour after eating. He would then remain free from pain and distress and all stomach symptoms until the same performance was repeated. There was a slight icterus of the eyes and a tawny appearance of the skin that lead to the belief that the existence of cholelithiasis was the cause of his suffering. In this case pain always followed the taking of food, and continued so long as there was anything in the stomach. The pain did not begin immediately but within a half hour after eating and continued until vomiting emptied his stomach, when relief was instantaneous and complete. There was a direct connection between the taking of food and the suffering. He never had attacks in the night unless food was taken. The presence of blood had never been detected by macroscopic examination although it may have been present in small quantities, as the vomited matter was never examined under the microscope.

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Emaciation was very marked. The man had an anxious expression and impressed one with the serious character of his illness and that he must have relief in order to avert an impending disaster. The point of greatest tenderness was over the pylorus in the midline. Pressure at this point gave rise to the most acute pain. The tip of the finger covered the point of greatest sensitiveness. Believing that we had a gastric ulcer to deal with, the abdomen was opened, a small area of induration, the seat of the ulcer, was found and a gastro-enterostomy done. The gall tracts apparently were free from any pathology.

The clinical history of the two cases just cited is in many respects very much alike, both suffered from pain in the epigastric region, vomiting occurred soon after the taking of food and was followed by relief. In each instance jaundice appeared, in one case very pronounced, while in gastric ulcer the icterus was sufficiently pronounced to arouse suspicion that gall stones might be the cause of his trouble. Both had eliminated one thing after another from their diet until they were taking scarcely any food; nutrition was beginning to be a serious problem with them. The difference between the two cases was that in one instance the pain always followed immediately after the taking of food, and ceased at once when the stomach was empty. The pain was not so intense and tearing, while with Mrs. L. she associated the pain and what she ate, overlooking the fact that her attacks would come on long hours after eating, in fact had no reference to the time and what she ate. Do not overlook this important point when examining these patients, to wit: when they complain of stomach symptoms determine absolutely the facts in connection therewith. Patients are confusing in regard to their statements, not intentionally but ignorantly so. Ascertain accurately regarding the onset of pain, its relation to the taking of food, and the time of relief after vomiting.

In arriving at a pōsitive diagnosis when a question exists regarding the pathology, every point must be taken into consideration and carefully weighed. The relative frequency of these two conditions should be considered. Fenwick gives the frequency of acute gastric ulcer in the two sexes as one in males to three in females. But in the chronic form this same writer

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and Dr. Seymore Taylor reverse the order of frequency and both practically give 72 per cent. in men and 28 per cent. in women. Welch gives the relative proportion as 40 per cent. in men and 60 per cent. in women, while Robson and Moynihan, basing their opinion upon their own personal experience, think that chronic gastric ulcer occurs as frequent in women as in old men. The acute form of ulcer occurs most frequently in early adult life, before thirty years of age, whereas the chronic form manifests itself later. There is no period of early life exempt from gastric ulcer; young women about the time of puberty are supposed to suffer most from this disease. Gall stones rarely occur before fifty years of age. Schroeder says that over 25 per cent. occur after the age of sixty. Cholelithiasis occurs four times as frequent in women as in men, Brockbank makes this statement and bases his opinion on nearly fifteen hundred autopsies. Gall stones rarely occur in early life—I have never seen a case on the summer side of fifty—but manifests itself with increasing frequency with advancing years. The fact that acute round ulcer of Cruvielhier is more prevalent in chlorotic young women and the chronic form most often encountered in old men, and extends over a long period of years, should not be overlooked. If the above statistics are correct the age of our patient should be taken into account and assist us to some extent in differentiating when encountering symptoms in the upper abdomen.

As the diseases we are considering progress, aside from the immediate danger of gastric hemorrhage, they are followed by a series of complications that are common to ulcer as well as gall stones that makes a positive diagnosis very difficult. The value of early recognition of gall stones and gastric ulcer is apparent when we come to the treatment. The slight danger of early surgical interference stands in no sort of relation to the very great danger of these two diseases themselves. In its earlier manifestation the treatment of ulcer comes under the care of the physician, but the later complications are of such serious import that surgical interference will offer the only possible means of relief. The sequence in both pathological conditions if neglected will be adhesions between the gall tracts, liver and pylorus, hanging the outlet of the stomach up high against the

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liver, giving rise to a valve-like formation of the pylorus that will obstruct thoroughly the outlet of the stomach and prevent the contents escaping. A little later, as a result of this stenosis, the stomach becomes dilated, with all its attendant unpleasantness. In cholelithiasis, as well as in gastric ulcer, we have a perigastritis with adhesions that may cause hour glass contractions and atonic motor deficiency. These are some of the so-called cases of gastralgia and neuralgia of the stomach that are frequently met with and fail to yield to the ordinary methods of treatment. I wish to emphasize by repeating that I do not know what the neurosis gastralgia and neuralgia are. They are dependent upon some other pathology than the nerve supply—per se—to the stomach.

Some of these cases become very anaemic, in the one instance owing to the fact that the food taken is soon rejected, and in the other to the mistaken idea that the taking of food aggravates the suffering. Kehr states that a patient who has gall stones suffers more from abstemious habits than if eating heartily, the flow of bile is interfered with, this favors stagnation, closure of the ducts, and infection. The long continued suffering interferes in some unexplained manner with metabolism, this is shown in the general appearance of the patient, and progressive emaciation. Chronic inflammation of the pancreas and with liver abscess formation sometimes follows; jaundice does occur in gastric ulcer as well as in cholelithiasis. In gastric ulcer, however, the appearance of icterus is a late manifestation and is dependent upon the perigastritis. The resulting bands of adhesion obstruct by direct constriction or by kinking or pulling out of line the bile ducts. I can readily understand where an ulcer extends into the duodenum the resulting inflammation might occlude the ampulla of Vater, thereby producing jaundice. In gall stones we do not have jaundice unless there is some obstruction to the escape of bile through the hepatic and common ducts. This may be due to the presence of a stone in the one or the other of them, or a result of inflammatory occlusion within the duct swelling or contracting the mucosa so that the free escape of bile is prevented. Bands of adhesion due to a pericystitis will have the same effect.

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In the past, too much importance has been attached to icterus as a diagnostic symptom of gall stones. Kehr states that it is absent in eighty per cent. of all cases. It must not be forgotten that jaundice and the resulting chalk or ash colored stools occurs in a very small per cent. of those afflicted with cholelithiasis. I wish also to reiterate that pronounced jaundice may be due to gastric ulcer. Do not wait for the appearance of this symptom before announcing the presence of gall stones, then instead of a simple malady you have serious complications.

In both conditions the loss of flesh and strength is pronounced. From the above description of the immediate and remote results you can readily see that much of the late pathology in the two conditions is very alike. The pain of gall stones is more acute and lancinating. I think the suffering more intense. It is of a boring, twisting, torturing character, whereas in gastric ulcer it is a hot, burning, gnawing pain. In both there are complete respites from suffering. The interval of freedom from pain may extend over variable period of time during which the patient thinks himself entirely well and free from disease. Then without the first premonition a most severe attack comes on with pain, vomiting, hemorrhage, and rapid loss of weight, or even death.

If the ulcer is at the lesser curvature it will give rise to fewer clinical manifestations than anywhere else, owing to food not coming in contact so often as elsewhere. Gall stone colic occurs independently of the taking of food, far more frequently than gastric ulcer. The pain of both can be definitely located; an especial tender point is noticed in gall stones about two inches to the right of the media line, and just below the costal arch. It radiates through the abdomen to the right side and into the right shoulder. In ulcer the pain is in the midline or very near to it, just below the ensiform process and is complained of in the back, to the left of the spine in the middle dorsal region.

Inflammatory thickening of the omentum or of infiltration of the lymph glands sometimes give rise to tumor formation that may be mistaken for the gall bladder or carcinoma. The enlarged and prolapsed gall sac may give rise to confusion, as in one case where I removed twenty-six gall stones from the great-

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ly enlarged and prolapsed gall bladder that had been mistaken for an acute appendicitis.

The mortality from gall stones and gastric ulcer is so high, that an early diagnosis and reasonably prompt interference seems imperative. About seventy-five per cent. of the cases of gastric ulcer yield to medical treatment, the other twenty-five per cent. give rise to complications that demand surgical interference for their relief, in fact cannot be treated in any other way. Brinton gives a mortality from all causes at fifty per cent., and Einhorn corroborates. Other authorities give it all the way from ten to fifty per cent., and seven per cent. of these die from hemorrhage alone. The mortality from surgical interference is less than five per cent. Kehr reports one hundred and ninety conservative operations on the gall bladder with only three deaths as a result of the operation, this is a fatality of one and five-tenths per cent. These were for the most part cystostomies. He also states that when the stones are in the gall bladder the mortality is less than one per cent. Kehr reports a fatality of about ten per cent. in all kinds of gall bladder pathology. Mayo-Robson states that he has never lost a patient after any operation of gall stones in the absence of serious complications. Dr. W. J. Mayo stated to me recently in conversation that he and his brother had had less than three per cent. of deaths in their gall bladder work.

On the other hand, during the past two years I have seen five deaths from rupture of the gall bladder; the disease had been recognized and an operation advised, the great danger pointed out, but owing to fear of the knife the relief so near at hand was declined.

Hemorrhage alone claims seven per cent. of all those suffering from gastric ulcer as her victims. The importance of this symptom as a diagnostic feature and guide to treatment is very great. The loss of blood may be so small as to be overlooked unless careful attention is given to the same. It may be necessary to examine the vomit under the microscope in order to detect the broken down blood cells, or a profuse hemorrhage may suddenly supervene when we are misguided in believing the ulcer about healed, that may bring our patient very near to death, if he does not die. The hemorrhage may assume a serious

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aspect from the simple abraded form of ulceration; the amount lost at one time may not be great, but it is continuous and in the aggregate more than the patient can stand. The fatal cases are due most often to the erosion of an artery or vein of considerable size. The appearance of haematemesis in a case of gastric ulcer calls for prompt surgical interference.

In cholelithiasis, hemorrhage from the stomach never occurs.

To recapitulate, the most prominent and always present symptom is pain. In ulcer this pain is of a peculiar kind and begins soon after the ingestion of food, and continues until relieved by vomiting or subsides when digestion is completed. Pressure over the spot where the pain is complained of usually aggravates it; complaint is made as though a knife were thrust into them, the weight of their clothing is unbearable, often the tip of a finger will cover the area of greatest tenderness. This tenderness on pressure never extends much or any to the right of the midline of the abdomen. Fagge states that pressure on the epigastrium will increase the pain in the back. Vomiting is another early and almost constant symptom. The patient is sick at her stomach. empties it without much difficulty, and obtains relief. The stomach contents should be examined for a hyper-acidity that is generally found. As blood is vomited in a very considerable number of cases, it should be carefully looked for. The specimen of vomit selected should contain very little food, and repeatedly examined for the presence of blood. The retching is not violent and as soon as the stomach is empty the patient is free from discomfort. The sickness at the stomach is associated with and rarely occurs independently of the taking of food. The blood vomited may be bright arterial or a dark grumous coffee-ground looking stuff that is recognized with difficulty. Altered blood may appear in the stools in the form of melaena, it is nevertheless a diagnostic sign. Gastric ulcer is frequently associated with anaemia. Emaciation is due partly to the patient not taking sufficient food, and partly to the nutriment ingested being vomited.

So long as gall stones remain passive there are no symptoms, but just as soon as they become active we have severe

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attacks of the most excrutiating and unbearable pain imaginable. This pain is of a twisting, tearing character that makes childbirth slink into the shade in comparison. Vomiting is an early symptom and is of a most severe character. The efforts at vomiting often suggest the possibility of rupturing something.

The ineffectual attempt at retching is very distressing, they go after something but never get it, it is just beyond their retch, they pull at their stomach as though everything would come up. I have never seen a patient retch and vomit so hard as during an attack of gall stone colic. Pressure over the gall bladder meets with the prompt resistance of the taut rectus muscle the same as is felt over an inflamed appendix. In ulcer the pain is at or very near the medial line, in gall stones just below the costal arch, and about two inches to the right of the midline. An enlarged gall bladder can seldom be felt, jaundice is present in but a small per cent. of cases and then is indicative of serious complications and suggestive of the long existence of the initial disease. The temperature is of little value, when there is a rise it also suggests the existence of complications.

I recognize that gastric ulcer and gall stones may exist for an indefinite period without clinical manifestations sufficient to require the patient to seek the aid of the family physician. The sudden onset of severe and grave symptoms may be the first intimation of the existence of a serious malady. This, however, is exceedingly rare and when they do occur demands prompt action. The symptoms of both at first seem to indicate gastric disease of varying intensity, that if passed over hastily will be looked upon as dyspepsia. Each succeeding year I see fewer cases of this functional malady and am rapidly reaching the conclusion that before long it will be consigned to the realm of the dead past.

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THE SURGERY OF THE GALL BLADDER AND BILE DUCT.

FRANK C. DAVIS, M. D., DES MOINES, IOWA.

This being my first appearance before the Iowa State Medical Society, permit me to state the following:

This paper is based upon an experience in Johns Hopkins Hospital; in the clinics of Professors Hans Kehr, in Halberstadt; Mikolicz, in Breslau; Eisenberg, in Vienna; Kocher, in Berne, and a two months experience with Drs. Will and Chas. Mayo, of Rochester, Minnesota, and my own cases, covering a period of some five years. During that time I have seen 137 cases of gall stone disease. I have personally operated twenty-one cases—fifteen cholecystotomies, three cases of chronic pancreatitis with stones in common ducts, necessitating a duodoctotomy, and two cases of empyema of gall bladder. The remaining case, the liver was involved, necessitating drainage of hepatic ducts. I have had two deaths, one an empyema, the other a stone in common duct, with liver involvement. All of the other cases I have had the opportunity to follow before and after operation, having seen all the operations and in many of these cases have assisted in the operation.

I wish to take this opportunity to give full credit to the surgeons above mentioned, and especially so to Dr. Will Mayo, and where in my paper I fail to mention or give credit to a point that has been especially brought out by one of these surgeons, it is to avoid repetition, and having been in close touch with these men, I have absorbed their ideas of gall stone disease, having had a like experience in a limited number of cases.

The problem of surgery of the gall bladder and bile ducts, the medical profession in general, and the laity are just awakening too. It has been aptly compared to the appendicitis problem, with these differences—unlike appendicitis, the patient is usually along in years and death does not come with that tragic suddenness. But above all there is not a proper understanding of this common disease, which is by no means the innocent disease the text books and our predecessors would have us think.

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Gall stones are so frequent—almost every tenth adult body exhibits them—that as a surgeon pointedly says, "every theater, every church, every concert hall, would resound with lamentations, if stones occasioned discomfort in all cases." But it is a well known fact that gall stones, even when they in thousands lie together in the gall bladder, need not occasion any discomfort. If the cystic duct is patent, the bile flows unhindered in and out, and so the stones lie quiet and still, as harmless foreign bodies, and for a time are not to be feared.

Kehr says only about 5% of gall stone subjects feel anything of their presence, and 95% remain, at least from severe suffering, entirely free. If with Riedel we assume that in the German empire alone two millions have gall stones, then only 100,000 feel anything of their stones, while 1,900,000 remain exempt from pain. They have, perhaps, sometime some dragging in the right side, they feel a slight oppression in the stomach, suffering from eructations and occasional anorexia, but on the whole there is no question of actual disease. The reason of this absolute latency of gall stones is the absence of all inflammation in and adhesions to the gall bladder, of changes in the wall of the gall bladder itself, and that upon which the principal emphasis is to be laid, that the cystic duct, the excretory duct of the gall bladder, must almost always remain free and patent. Bevan found that 16% of the cadavers in Rush dissecting rooms had gall stones. The Johns Hopkins autopsy reports found 7.5%. It seems to me that the accepted percentage as applied to the public at large is too high. But the proportion of actually "slumbering gall stones" is much less than we have hitherto thought, and in a considerable number of cases the term is a relative one and means that the disturbance is so slight that the cause is unsuspected. We have grown so accustomed to looking upon the colic and jaundice as the one symptom of gall stones, that we often, if not usually, overlook the more chronic manifestations.

THE SURGICAL SIGNIFICANCE OF JAUNDICE.

The obstruction of bile is caused:

1st. By the swelling of the mucous lining of the ducts, due to an infection.

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2nd. By gall stones in the common duct.

3rd. By disease or tumors of the ducts.

4th. By disease or tumors of the head of pancreas.

5th. By pressure from without the ducts, as in certain malignant tumors of the pylorus.

6th. Some forms of cirrhosis of the atropic or hypertrophic variety may obstruct the smaller liver ducts and result in jaundice.

Gall stones in gall bladder do not produce jaundice, except under rare circumstances. The rule is that jaundice with stones means a stone in common duct.

There are two exceptions: 1st. An infection of the gall bladder which travels along the ducts, producing a cholangeitis, and is usually accompanied by some inflammatory reaction, as a slight temp, quickened pulse, and follows an attack of colic, with or without passage of a stone.

2nd. An inflammatory gall bladder or cholecystitis in which infection has passed through coats and results a local peritonitis, which acts mechanically upon the bile passages. The jaundice in these cases is not complete, and as a rule, quickly subsides.

Therefore, in uncomplicated gall stone disease, jaundice is not to be expected.

Stones in the common duct produce a jaundice which is at first incomplete. In the early stages, the duct dilates, and when the biliary accumulation is under some pressure, the bile passes the obstruction with colicky pains, and the icterus clears up somewhat. If the stone be of sufficient size to materially obstruct the duct, the intermittent jaundice takes on a remittent form, that is, it never entirely clears up. In time the duct wall becomes infiltrated with connective tissue cells and contracts tightly about the stone and the jaundice becomes complete.

Stones which pass the cystic duct usually pass through the common duct easily, as the latter is three times the size of the former. Stones which remain in the main bile passages are therefore either of large size and have been slowly forced into the ducts, or are the so-called "ball valve stone" of Fenger. In the latter case, the ampulla of Vater, on the surface of the intestine, is a little smaller than the stone, and the stone rolls about in the

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duct; at times it is at the intestinal orifice, causing a slight colic, and increase in jaundice, then rolling away with relief of subjective symptoms. Such rolling stones are usually accompanied by an infection of the bile passages, and chills, slight in character, fever and sweats.

Many of these cases come to us with a diagnosis of relapsing biliary fever or malaria. Occasionally the stone gains in size by additions from infected ducts and biliary deposits, forming a large stone, having as its nucleus the original stone from the gall bladder. Stones in the common duct cause more or less jaundice. Mayo reports several cases in which stones were removed from the common duct or diurticulum, in which no jaundice.

Jaundice from gall stones should give a history of previous colic. Physical examination will usually be negative, the gall bladder is shrunken instead of distended, due to the great inflammatory thickening of its coats and the contractions of this connective tissue after the stone is expelled.

Chronic inflammation of pancreas or chronic pancreatitis is accompanied by jaundice in many cases, and is often confounded with malignant disease. The previous history may be that of gall stones or obscure epigastric distress. The jaundice does not change in the early stages, as is to be expected in gall stones, in the common duct, and there are fewer of the repeated colicky pains. It also differs from malignant disease in the fair degree of health maintained for a length of time beyond expectancy of cancer. The gall bladder can be felt distended, but without nodules, and the patient may be of any age.

Jaundice from malignant disease may have a history of gall stone attacks years before, and the cancer is often due to irritation of calculi. Mayo in 454 operations, found cancer of gall bladder or bile ducts in twenty-one cases (5%) and in nearly all a distinct history of previous colics was elicited. The chronic irritation of calculi in a gall bladder in which inflammatory changes have taken place, seems to be the usual pre-cancerous condition. This is certainly a serious factor in deciding as to operation.

The jaundice in malignant disease comes on after some in-

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definite history of abdominal disease, and preceded by loss of flesh and progressive weakness, without much acute pain. The jaundice slowly but steadily increases and does not change day by day in intensity, excepting to get deeper. On palpation, the distended gall bladder can often be felt. In the latter stages a little ascitic fluid can be detected in abdomen. Age of patient over 35 years is to be noted.

The hypertrophic cirrhosis of the liver of Hanot or biliary cirrhosis is a disease of young adults, and the jaundice is slight but persistent. The great size of the liver is absolutely diagnostic.

Atrophic cirrhosis and allied forms of hypertrophic cirrhosis are usually found in adults. The jaundice if present is a late symptom, and ascitis is frequent. Here again physical examination of the liver and spleen, with alcoholic history, complete the diagnosis.

Catarrhal jaundice is usually due to an extension of a mild infection from gastro-intestinal tract, most common in young adults. The age of patient, slow pulse and lack of general symptoms makes the diagnosis easy.

Catarrhal jaundice may in isolated cases complicate appendicitis, pneumonia, cancer of stomach, ulcer of the duodenum and a host of common diseases, but as in these cases, it is usually incomplete and transient and does not long mask the primary source of disease.

This brings us to the question, What causes latent calculi to become active? Mayo says, "there are two explanations—one that of Kehr, which lays everything to an infection, and the other, the more generally adopted theory of mechanical interference with drainage from gall bladder. As a matter of fact, both cases are usually present, the one depending upon the other. If the circulation of bile is free, the germs will be mechanically washed away, so that lack of drainage is a most important element. On the other hand, infection acts as an irritant to the gall bladder, and generally induces the contractions which engage the stone at the entrance of the cystic duct. In other cases, the swelling of the gall bladder and ducts from the infection, causes of itself mechanical obstruction. The resulting

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disturbance depends upon the acuteness of the infection and upon the ability of organ to distend. The gall bladder in this respect has the advantage over the appendix, as well as a better blood supply. Rupture and gangrene are therefore rare, and sudden death from fatal perforation does not often occur."

The calculus gall bladder was found by Mikolicz to contain bacteria in eighteen out of twenty-three cases. We may take it for granted that all cases of "slumbering gall stones" contain bacteria, needing but some interference with drainage to start into activity, or reinfection from the intestine may occur, either directly or by way of the portal circulation or bile itself. Bacteria may remain in an attenuated condition a long time in the gall bladder, but capable of return to virulence under favorable circumstances.

We know, that under favorable circumstances, troublesome gall stones may again rest and the various medicinal springs probably act by keeping up that free circulation of bile, which is so essential. The question here for consideration is, whether, in view of possibility, nay, probability, of further extension of the trouble, it is not wise to remove active gall stones early. Certainly the results of early operations for gall stone disease are remarkably good. Robson, Kehr, Ochsner, Murphy, Richardson, Mayo, report mortality of less than 1%. And in over 2,000 operations of this kind, there was not a single instance of reformation of the gall stones.

Complications of the gall bladder or involvement of bile ducts are due to changes in their walls, and the calculi may then become but an incident in the pathological process which they initiated. Repeated infections with prolonged interference with drainage cause the walls of the gall bladder to become infiltrated with inflammatory products and the connective tissue formed interferes with its elasticity under pressure and limits its power of contraction. The obstructing stone is forced through the cystic duct into the common duct, there to remain, or pass out into the intestine, or it may become encysted in a thick-walled pouch composed of the remains of the gall bladder, causing recurring attacks of inflammation. Adhesions to surrounding viscera may prevent fatal perforation or divert it into a

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neighboring viscus with spontaneous discharge of infected fluid, and incidentally, of the calculi. Even if all the stones are so discharged, which by no means often happens, the adhesions remaining may be a prolonged source of distress to the patient.

The possibility that all of the stones may be expelled through ducts is alluring to both the physician and patient. This may happen, but Mayo says: "We have never operated upon a case in which the patient brought us stones detected in the faeces, that the gall bladder did not contain more."

Robson found stones lodged in the common duct in 20% of his cases. Evidence that a stone has successfuly passed into the intestine does not contraindicate operation. It is altogether probable that more stones remain. Occasionally one finds a case in which stones have remained for years in the common or hepatic ducts, with comparatively little trouble, but such instances are rare, and the rule is that infection of the liver ducts and occasionally those of the pancreas takes place, and render surgical intervention a necessity, in these conditions, with the jaundice which usually coexists, the operation is far from safe.

Infection of the liver ducts is the cause for the majority of deaths after operation, and introduces an element of uncertainty in the prognosis.

Talma demonstrated that either colon or typhoid bacilli injected into the gall bladder would not infrequently travel up the hepatic ducts and cause extensive pathological changes in the liver. Mayo says, in their experience infection of the liver has been the cause of death in nearly one-half of the cases. The only safeguard in operation upon such cases is free drainage of the hepatic ducts, and Kehr says that the hepatic ducts require drainage in 37% of cases, and this has been my experience.

A proper understanding of chronic pancreatitis has been largely due to Robson, who first noticed the disease in connection with his operative work upon the biliary tract. In fact, the inflammatory disease of the pancreas may be said to be the result of an inquiry into the causation of some of the complications of gall stone disease. The reason for this depends upon certain anatomic facts.

The common duct passes around the head of pancreas, be-

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tween it and the second part of the duodenum. For one and one-half inches the common duct lies fused, or in close contact with the main pancreatic duct, forming the ampulla of Vater. The joint opening on duodenal surface is situated four inches below the pylorus.

It is easily seen that a gall stone may obstruct the common intestinal orifice without blocking the pancreatic duct or at any point in the lower one and one-half inches of common duct may exert pressure on the pancreatic duct, or a stone may occlude it entirely at the diverticulum of Vater, thus explaining the etiologic relationship existing between pancreatitis and gall stone disease.

The effect of this pressure on the pancreas is to set up connective tissue changes, causing a pancreatitis.

The experimental work of Hildebrand and Opie as ligating the pancreatic duct, the result was acute pancreatitis.

Robson in his operative work found twenty cases or more in which chronic pancreatitis resulted from partial obstructions or infections of the duct, interfering with the drainage.

Considering the frequency of gall stones and infections of the liver ducts, which must affect the pancreatic ducts more or less, biliary calculi occupy the most important position as to the causation of pancreatitis. Mayo says in thirteen recently reported cases of acute pancreatitis operated upon, gall stones were found in ten. Opie, in twenty-nine cases of chronic pancreatitis, found the three most common causes to be, pancreatic calculi, gall stones and carcinoma, and notes its frequent appearance as a complication of cirrhosis of liver.

The symptoms of the acute form are repeated attacks of shock and collapse. The disease is ushered in by the most acute and sudden pain in the epigastric region, with profound collapse. The abdomen becomes at once distended, and this with nausea and vomiting may lead to the diagnosis of intestinal obstruction. Among the special symptoms noted are: nervous unrest, (Halsted and Opie) lividity, (Evens) repeated attacks of collapse, (Fowler) hiccoughs, (Mayo). The most important diagnostic feature of chronic pancreatitis is jaundice.

In acute and subacute pancreatitis, the surgical indication

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beyond the opening and drainage of septic accumulations, would be the removal of gall stones, if present, and the establishment of free drainage through the gall bladder. Treatment of chronic pancreatitis is by drainage and this is best accomplished by way of the gall bladder, either by a cholecystostomy or by a cholecystenterostomy.

I have operated upon two cases in which diagnosis of gall stones seemed certain and in none were calculi found. The gall bladder was thickened and there were a few adhesions. Mayo says in 454 cases they had twenty-six such cases, evidently a chronic cholecystitis without stones, but with a similar symptomatology; the colics were undoubtedly due to plugging of the bile passages with the tarry material with which the gall bladder is filled. There was no evidence that stones had ever been present.

THE PRINCIPLES UNDERLYING OPERATIONS UPON THE GALL BLADDER AND BILE DUCTS.

When gall stones are once formed, no medicine can relieve them, though much can be done for accompanying catarrh; medical treatment should be thoroughly tried before surgical treatment is resorted to. It is often impossible to say what operations will have to be performed, and the surgeon who attempts to relieve their conditions must be prepared for whatever he may find.

Every gall bladder containing calculi can be looked upon as infected, although without free circulation of bile and nearly normal gall bladder found in "slumbering gall stones," it is slight and complete closure of the gall bladder and abdominal incision may be performed, but it will occasionally, even then, lead to disaster, to say nothing of the danger of overlooking stones. Cholecystostomy and drainage is the operation of choice in these cases.

A small incision of two to three inches only may be required, but often it is necessary to explore the ducts, and instead of prolonging the incision down as formerly carry it upward in the interval between the ensiform cartilage and the right costal margin as high as possible, thus exposing the upper surface of

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the liver very thoroughly. By lifting the lower border of the liver in bulk, it is necessary to first draw the organ down from under cover of the ribs, the whole of the gall bladder, cystic and common ducts are brought quite close to the surface, the gall bladder is usually strong enough to endure gentle traction, which holds the parts well exposed. Thus exposing the whole lengths of the ducts with the head of the pancreas and duodenum and common duct with gall bladder, cystic and hepatic ducts quite easily.

After removal of the obvious concretions pass finger behind duodenum, along course of hepatic ducts, to feel if gall stones are there. In other words, always make sure that all gall stones are removed at time of operation.

Never spend a long time in manipulating the impacted stone, but at once incise the duct and remove the concretion.

Drainage is continued until the bile is normal.

The removal of the mucous membrane, recommended by Mayo, I believe to be the best operation, and not difficult to do, in cases where is needed temporary hepatic drainage with the permanent benefits of cholecystectomy. In contracted gall bladder, cholecystectomy may be necessary or advisable. It is easy to remove very contracted gall bladder and use cystic duct as a pedicle and ligate it.

The operations of choledochotomies, duodenocholedochotomy and cholecystenterostomy I will not describe.

In case of malignant disease, much more extensive operations may have to be made. If pyloric stenosis exists, pyloroplasty or gastroenterostomy will have to be performed.

In conclusion, permit me to present the following:

1. I would advise the removal of latent calculi, provided it does not seriously add to the general operative risk, especially as intelligent examination of the patient's history will often develop certain stomach symptoms which are due to this cause and from which relief is thereby obtained.

2. Whoever wishes to learn the special diagnosis of cholelithiasis must know accurately its pathology. The practitioner of internal medicine has gained his knowledge for the most part, upon his observations at the bedside and the autopsy table.

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This is the reason why the majority of doctors fail to recognize all the changes which gall stones produce in the living. I appeal to the general practitioner to seek every opportunity of seeing autopsies "in vivo," of studying the processes and of being able to prove the obstruction of stones, causing the complication of liver involvement and pancreatitis.

3. Icterus is wanting almost always in all inflammatory processes in the gall bladder, also in the beginning of gall stone disease. In 80% of all gall stone cases icterus is absent.

4. The importance of thorough drainage of the hepatic ducts in all cases.

5. I would most strongly urge that we should operate early, before serious complications have ensued, and that the operation should be most thorough and carefully performed.

Discussion on the Papers of Drs. Wright and Davis.

DR. C. F. WAHRER, of Fort Madison.—*Mr. President:* If it were not for taking up too much time of the Society, I would like to say a great deal in complimenting Dr. Wright and Dr. Davis on their excellent papers, but there is no need of it. I wish to mention one diagnostic point in connection with Dr. Wright's paper. If he has mentioned it, it has escaped me when it was read. It may not amount to a great deal, but in some cases in the hands of practitioners it may serve a good purpose. Where a case is very doubtful as to whether we have a gastric ulcer or a case of gall stones to deal with, it may be decided by some local application, as, for instance, taking a solution of salt water may bring on a severe paroxysm of pain, and it may help in the diagnosis. On the other hand, where we have pain, and it is very hard to make out whether it is referable to the stomach or gall bladder, the taking of about seven or ten grains of orthoform will act as a local anaesthetic, and subdue pain quickly. Of course, we know that it will not have any effect on the gall stones.

Another remedy which has been recently offered to the profession by the same firm is what is called anaesthesin, which has acted well in a few cases.

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DR. T. J. MAXWELL, of Keokuk.—It seems that a great deal has come to us of late through disease of the gall bladder and gall stones. Formerly we supposed that all gall stones produced pain, some disturbance, but as the papers have indicated, there are eighty per cent. of cases in which we have no icterus, no symptoms of gall bladder trouble, so far as jaundice is concerned.

To illustrate what may happen with a large number of gall stones in the enlarged gall bladder, two years ago I had the case of a lady under my care. She rode on the train on Monday from Kansas City to our city, and was taken suddenly ill with pain and vomiting, and a rending sensation in the abdomen. She continued to vomit and to reject everything that was taken into the stomach until Friday. I carefully examined her and discovered a tumor between the ensiform cartilage and the umbilicus as large as my fist, and I inquired if she had ever had any previous attack. She said no, and that she had never had anything the matter with her. She said she could eat three meals a day always, and sleep well, and always had been in good health. I did not know what the nature of the tumor was. I gave her a cathartic, which moved the bowels, but still the tumor was there, and there was tenderness in the abdomen. She continued to vomit, more or less. This continued until Sunday. Monday morning she was still vomiting and was unable to retain anything on the stomach. I said to her, "You will die if you do not have an operation; I do not know what I will find, but there is some obstruction that must be removed." She said to me, "Go ahead and do what you think best." I opened the abdomen, and the first thing I came in contact with was the stomach, and it seemed wrapped around a tumor, and in pushing the tumor toward the left, I found a gall bladder a little larger than an orange, and in delivering it from the abdomen I surrounded it with gauze, incised it, and there escaped from it an amber-colored fluid. When the fluid ceased to flow, I found a mass of gall stones, a hundred and ninety-three in number. One was plugging the cystic duct. It was removed. I then introduced a sound through the cystic duct into the common duct, and into the duodenum, and then again up into the liver, but

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found no further obstruction by gall stones. I curetted with a dull curette, washed out the gall bladder, which did not seem to be septic, closed the wound with catgut, attached it to the abdominal wall by one stitch to keep it from revolving again and carrying the stomach with it. This patient recovered without any trouble, and illustrates very well the fact that it is not necessary to resort to drainage in all of these cases. Drainage is a long-drawn-out process, and is often very distressing to the patient.

With regard to neuralgia of the stomach, I had a case some years ago that complained of pain in the stomach, that simulated ulceration of that organ. There was no tenderness. She vomited every afternoon. I treated her for eight months, without benefit, and I concluded that the pain was reflex. She was forty-four years of age, and had borne two children. I asked her about the condition of her uterus, and whether she had ever had any discharges associated with pain, and she said that she had had none. I examined her carefully, and found a granular os, very large and strawberry-looking. I cauterized it thoroughly with nitrate of silver; put in a compress of wool and glycerine, and did not see her any more for about six weeks. She made a visit to Iowa. I was then in practice in Illinois, and when she came back she came to my office and I hardly recognized her on account of the great improvement in her appearance. She had gained materially in flesh; her cheeks were rosy. I said to her, "What has happened?" She replied, "I have not had any pains since the morning of that application." This case illustrates that we may have a reflex pain in the stomach which simulates ulceration. The fact that these irritations and conditions about the gall bladder produced by gall stones often terminate in cancer of the pancreas or of the liver, should urge us to operate early. We should urge patients to have these obstructions removed. In a case of that kind which came under my observation sometime ago, I did a cholecystenterostomy with the Murphy button. The pancreas was very much enlarged, hard, nodular, evidently of a carcinomatous nature.

Dr. George R. Skinner, of Cedar Rapids.—A case similar to the one reported by Dr. Maxwell came under my care a few

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months ago. The woman complained of pain in the stomach, and had been treated for ulceration of the stomach by a number of physicians. She had been at a hospital in Iowa City and was treated there for ulceration of the stomach by rectal enema, and I think an operation was advised. She came under my care, and I found that she had pain over the stomach and soreness, which were due largely to efforts at retching. She almost invariably ejected her food from the stomach—she said, all of it, but she did not, because she was not poorly nourished. She had quite a number of external hemorrhoids, not of the mixed variety, and she had the most persistent, painful, indurated rectal fissure I have ever seen, so much so that she almost went into convulsions when I touched it with a probe. She had been married a good many years. She had a sensitive condition of the vagina, and her cervix was covered with vegetation. There was quite a discharge from the uterus, evidently the result of endometritis. She went to the hospital; I removed the hemorrhoids; excised the base of the ulcer, and united it with suture. I curetted the uterus, used the cautery on the cervix, treated the vagina with boroglyceride tampons for a few days, and also looked after the rectum. Since the operation was performed, she has not vomited once, and has not up to the present time. There was a case of purely reflex trouble, and these cases, I think, often occur and are not to be eliminated in reference to diseases of the stomach and of the gall bladder.

DR. DONALD MACRAE, JR., of Council Bluffs.—In regard to the differential diagnosis between ulcer of the stomach and disease of the gall bladder, I believe that in a large majority of cases it is impossible, at least in quite a large proportion of cases. This was forcibly brought to my notice sometime ago by a case which, to make a long story short, was something like this: A lady was brought to me with a typical history of gall stone colic, gall stones having been found in the faecal discharges. She had had a history of jaundice and all the classical symptoms of gall bladder trouble. We made a diagnosis of stones in the gall bladder and common duct, and operated. The stones were removed; drainage was instituted according to the Mayo method of the common duct operation, and everything

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seemed to be favorable for a good termination. The patient, however, continued to vomit. She rejected all food stuffs, and at the end of two weeks she died of exhaustion. Post-mortem examination revealed a field of operation absolutely perfect. There was no infection whatever. Drainage was thorough in every particular. The peritoneum was in good condition. But on opening the stomach, which was taken up carefully, eighteen well-defined ulcers were found in this organ, each one simulating an old classical round ulcer. Some were fresh, others were old. Old cicatrices were found in the mucous membrane of the stomach which showed that the healing process had gone on, and that ulcers had been present for many years in this stomach. In this case there is no question in my mind but what the condition originated in ulcers of the stomach, or in a gastroduodenal infection or catarrh, with secondary extension up the common duct into the gall bladder and liver, with cholangeitis resulting from this gastroduodenal infection. In this case the primary symptoms appeared to be, and the history pointed to it, limited to the gall bladder, and yet after thorough evacuation and removal of the pathology in the gall bladder and common duct, the actual disease continued to exist. There was only one ulcer in this case that was discernible from the outside, and that was one on the anterior abdominal wall. Had I gone over more thoroughly this case and made a diagnosis from the one ulcer at this point, turned it in and stitched it over, I would still have seventeen ulcers remaining. What are you going to do about it? In some cases, I repeat, the differential diagnosis is absolutely impossible.

DR. WRIGHT (closing the discussion on his part).—The point I tried to emphasize was the importance of making more careful examinations in our cases of clinical manifestations in the upper abdomen. It was for this reason that I repeated and hammered what I did over some of the symptoms bearing upon the examination of these cases. I recognize that we have in many diseases this reflex vomiting, but it is different, I think, and it should not confuse us with diseases of the stomach, or disease in the upper part of the abdomen, and disease located elsewhere and giving rise to the clinical manifestations of symp-

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toms, as was apparent in Dr. Skinner's case. I think that the symptoms in the case reported by Dr. Macrae of so many ulcers of the stomach having been found were not gone over carefully enough. It is my judgment that the symptoms from the stomach or the ulceration, rather, was the cause of the symptoms, and had he subjected the patient to the simple test of salt solution and orthoform, it would have cleared the case up, or had the vomit been examined with that number of ulcers present, broken-down blood cells would have been found at some time, and I think the gall stones in his case were probably late in giving rise to so much trouble. Had the adhesions between the gall bladder and gall ducts been followed to the stomach, this course would have led to the detection of the ulcers, and they would have been found and relieved. I think that his case emphasizes the importance of more care, even in the hands of the most skillful. The case he has cited illustrates very forcibly the importance of a great deal of time and thoroughness in our examinations of these cases before subjecting them to operative interference.

DR. DAVIS (closing the discussion).—With reference to the remarks of Dr. Maxwell as to drainage taking a long time, I do not agree with him. Take the ordinary case of cholecystostomy, and normal bile appears on the fourth or fifth day, and almost invariably on the tenth day it is absolutely normal. Drainage can be removed and in from three or four days to a week the sinus usually closes.

With reference to gall stones, in which the pancreas is involved and calling the case one of carcinoma, I would caution the surgeon in calling an involvement of the pancreas, especially attended with gall stones, carcinoma, because in by far the majority of cases, where there is involvement of the pancreas with gall stones, it is usually a chronic pancreatitis, and until the question has been submitted to the pathologist, the diagnosis is much more likely to be a pancreatitis rather than carcinoma.

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SYSTEMIC INFECTION FROM GONORRHOEA.

DR. NATHAN C. MORSE, ELDORA, IOWA.

Mr. President, Ladies and Gentlemen:

Systemic infection as a result of a latent blenorrhoea, is of frequent occurrence. It makes its appearance, in the majority of cases, about the third week of a posterior urethritis, but may appear at any period from two or three days, to as many weeks or months, following the first or local attack.

The cylindrical epithelium of the urethral mucosa, according to the experiments and observations of Neisser, is the natural abode of the gonococci. Here they remain active and aggressive, and if not obliterated finally invade the prostatic ducts and follicles. The columnar epithelium of the mucosa within the prostate serves as a protection for and perpetuates the lives of the gonococci and the mild alkaline secretion of the prostate, according to the same writer, ministers to the maintenance of their lives.

Authorities differ upon the question as to whether or not latent gonococci themselves penetrate the cellular tissue and the tunics of blood, but more recent experiments have proven beyond reasonable criticism that the gonococci may for a long time remain dormant within the prostate, secreting toxins of more or less virulency that may be absorbed by metastasis and carried to various parts of the system. The fact that the gonococci may be the sole instigator of the infection is also conceded by nearly all recent writers on this subject. From the new edition of "International Text Book of Surgery," page 150, I find the following: "The gonococci are now proved to be capable of producing not only local but metastatic pyogenic effects. Werthein has shown in a case of gonorrhoea that the capillaries and small blood vessels of the submucous tissue or lining of the bladder were filled with gonococci, some partly decomposed and others well preserved. Welch has shown that endocarditis in association with other pyemic morbid changes

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may be due to the action of gonococci." Thayer and Blumer, of the Johns Hopkins Hospital, demonstrated by a simple blood culture that gonococci were present in a fatal case of endocarditis. Herring has found them in the spinal meninges, and Councilman found them intact in the cardic muscles.

Briefly, then, the system may become infected in three ways:

1st. Through the glands of Littre, in the posterior portion of the urethra.

2nd. Direct infection through the prostatic ducts and follicles, by the absorption of the gonococci or toxins secreted by them, or

3rd. The gonococci may penetrate the subepithelial and deeper tissues of both urethra and prostate and by means of leucocytes, for which they seem to have a special affinity, they or their toxins are carried through the blood to the various tissues or parts of the body.

For my own convenience, and with a desire to be as brief as possible, I have divided systemic infection into but two classes:

1st. General systemic infection, where the entire system seems involved without reference to any special part or organ, a general invasion, if you please, or true gonorrhoeal pyemia or septicocuna.

2nd. Localized infection, or where the gonococci or their toxins have been carried to certain parts or organs, causing lesions somewhat local in character, the nomenclature for which conditions are simple and self explanatory, viz: Gonorrhoeal rheumatism, gonorrhoeal peritonitis, gonorrhoeal neuritis or myelitis, gonorrhoeal endocarditis, gonorrhoeal pleuritis, etc., all of which simply designate the local points or parts involved and all are more or less secondary to the first or general infection.

In this connection it should be remembered that infection of the regional lymph glands (inguinal) epididymitis, prostatitis, cystitis, pyelitis or peri-urethral abscess, etc., are not the result of systemic infection, but rather extension of the inflammation by continuity, whereas gonorrhoeal conjunctivitic—oral or rectal

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gonorrhoea, are the result of direct implantation of the gonococci upon their mucous surfaces and are therefore not within the scope of this paper.

SYMPTOMS OF SYSTEMIC INFECTION.

I have searched very diligently but find little literature upon this subject. It is not even mentioned by our most recent surgical writers and yet typical cases are not by any means uncommon.

The symptoms ordinarily begin abruptly with or without a rigor, and closely resemble those of septicaemia, except are more violent. The temperature rises rapidly to 103° or 104°, remains high with morning remissions. The patient feels and looks ill. His condition rapidly grows worse, temperature becomes higher and higher, and he passes into a typhoid condition, death occurring about the tenth to the fourteenth day. Vomiting is rare, constipation the rule. and lastly the urethral discharge diminishes or is completely arrested.

If, however, as frequently happens, the patient's powers of resistance prove sufficient to repel the more serious attack and the temperature does not exceed 105° by the fifth or sixth day, the symptoms will usually become more localized in character and the lesion will ultimately be confined or limited to some one part or organ. If the patient be a female a gonorrhoeal peritonitis is the most usual result, or if a male gonorrhoeal rheumatism or arthritis is the common sequel, and if the pulse assume an abnormally high pulse rate you may expect an endocarditis, the most common of all complications.

The following cases are quoted as typical clinical pictures of the most pronounced type of infection:

Case 1—W. G., aged 24, male, of rather delicate build, contracted gonorrhoea about five weeks prior to the time I first saw him. He stated that a few nights before he was out in a storm, got thoroughly drenched and very cold and had a hard chill. At this time there was a slight discharge from the urethra. He seemed quite ill, said his bones ached and pained him so he could hardly walk. Temperature 103°, pulse 110. Recognizing the serious condition of the patient, he was ordered home, placed in a hot bath, the post urethra was carefully and

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thoroughly irrigated with a solution of permanganate of potash. The next day he seemed slightly improved, temperature dropped to 101°, but pulse continued to remain high. In the evening he grew worse, temperature reached 105° and he became delirious. Despite everything we could do the patient's resisting powers diminished instead of increasing and the temperature became higher and higher until at the time of his death it was 108°, the tenth day after being confined to bed.

Case 2—Occurring in the practice of Dr. E. W. Clark, of Grinnell. M. A., aged 19, contracted a gonorrhoea eight weeks prior to his having called upon Dr. Clark. Patient at this time complained of a chilly feeling and extreme weakness. Temperature 100°, pulse 120. The following day his temperature rose to 102°. He had a severe headache and complained of pain in his joints, especially the right hip. Large doses of salol were given without benefit, patient gradually grew worse and died on the eighth day. Highest recorded temperature being 106°.

In the milder form, or where there has been a successful resistance of invasion, the following case will illustrate the most common type:

Mrs. S., aged 36, the husband informed me had been feeling badly for several weeks, has had a vaginal discharge, which he admits was gonorrhoeal but thinks she was about cured of this. A week before my visit she had a chill following exposure and has had more or less fever every day since. Has been confined to her bed for five or six days and growing worse daily. The patient, a strong, and otherwise vigorous young woman seems quite ill, her face has a peculiar pallor, she lies constantly on her right side. At the time of my visit her temperature was 101°, pulse 120, skin moist and sticky, tongue heavily coated. She complained of severe pain in all her joints, especially the back. The pain increases on the slightest movement. Urine very dark color and scanty. Is comfortable only under morphine. I administered a laxative of calalactose and followed this with salol. She improved somewhat and a few days later the symptoms became more localized, and ultimately we had a pronounced case of gonorrhoeal peritonitis. My time being greatly limited I can but briefly refer to the two most common results following sys-

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temic infection, namely, gonorrhoeal peritonitis and gonorrhoeal rheumatism. Both are usually the result of a mixed invasion; clinically they are easily recognized. A history of rheumatism or peritonitis following a gonorrhoea with the discovery of gonococci in the urethral or glandular secretions, makes the diagnosis probable, and doubly assured are we when ordinary remedies fail to give relief.

TREATMENT.

Granted that we have a case of acute gonorrhoeal pyemia, gonorrhoeal peritonitis or gonorrhoeal rheumatism, what can we do for them by way of palliation or successful treatment? Our text books offer us little of value. Large doses of quinine or iodide of potash are the only remedies suggested. The entire treatment may be summarized in the endeavor to support the strength of the patient with symptomatic treatment.

During the spring of '96 I was treating a man affected with an inoperable osteosarcoma of the left shoulder. This man had been afflicted for several years with rheumatism and at this time, although the tumor was large and painful, yet he complained more of the rheumatism than the sarcoma. I was injecting into the tumor daily a mixed culture of prodigiosus toxins, (Coley) prepared by Park Davis & Co. The dose being at first 3 minims, but increased 2 minims daily until a slight reaction became noticeable. About the eighth day of treatment his rheumatic pains left him entirely and from this time until a year later, when he succumbed to the effects of the sarcoma, he was free from all rheumatic trouble. The relief being so marked lead me to question him closely and I ascertained he was an old gonorrhoeal subject. A few months later a young man was brought to the hospital suffering with gonorrhoeal rheumatism of the left knee. I gave him 5 minim doses of prodigiosus sterilized by the addition of 6 minims of a 1-40% formalin. In less than ten days his recovery was complete.

In March following Dr. Bouffleur, of Chicago, was invited to see a case of gonorrhoeal peritonitis (Case 4 as above referred to). The condition of the patient was such that operative measures were deemed inadvisable, in fact there seemed no hope of

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recovery. As a last resort I used 8 minims of the serum with 1% of the formalin solution, giving in all about five injections, six to eight hours apart. The patient making a good recovery without disturbing after effects.

My practice being necessarily very limited, I have had occasion to use the serum but four times since 1899, three of these were for gonorrhoeal rheumatism and one for gonorrhoeal peritonitis. The results in these cases being very satisfactory. At this time all I can say is, in lieu of something better I will gladly furnish the serum to any colleague having a case of this character. Its use may widen our knowledge of its physiological action and out of this crude effort some more capable physician or bacteriologist may rear a scientific remedy.

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Section Mental and Nervous Diseases.

REPORT OF CHAIRMAN CLIFTON R. SCOTT.

Mr. President and Members of the Society:

I shall not, in my report as chairman of the Section on Mental and Nervous Diseases, review the progress of the year to which you have all had access in the current literature, but rather to call attention to some of the important fields for investigation neurology presents. At present, bacteriology with its attendant antiseptic surgery, sanitation and serum therapy, have so occupied the medical eye as to obscure our vision for the great central factor of medicine, namely: the nervous system. A great writer on physiology has recently said that the physiology of the future will be the physiology of the nervous system. A similar truth may be stated, that "The future pathology of general medicine will be found in the study of the pathology of the nervous system."

Just as the work of Hitzig, Fritseh Ferrier, Yeo, Schafer, Horsley, Munk and others upon cerebral localization has been of untold value in diagnosis in cerebral surgery, neuroses, psychoses and internal medicine, so will a study of trophic centers and trophic processes be to a rational understanding and management of muscular atrophy, nutritive disturbances of the skin, membranes, viscera, bones, etc., as well as anaemia, neurasthenia, chloroses and allied diseases. Our present knowledge upon these questions is in a very unsettled state. At the present time, there is the greatest activity among educators in the study of psychology and mental development. Much of their work is done by subjecting many children to tests and tabulating their results. Histological, physiological and pathological study of the nervous system is largely ignored, and the statistics accumulated by their tests are largely vitiated by the failure to separate the abnormal from the normal.

They even charge that physicians are so biased by their belief in pathological states, as to render them incompetent to

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distinguish backwardness from arrested development or backwardness from imbecility. The neurologist should be the very man to detect whether a child's condition is one of backwardness, arrested development, or imbecility, and by being guided by his advice a great saving of energy for teachers and of time for normal pupils could be made. The neurologist is the one to discover whether backwardness in a child is due to defects of vision, speech, hearing, mental fatigue, or cerebral defect. He should be able to give such advice that the bright, precocious child shall not have such harm done to its brain and nervous system by injurious training, as to cause arrested development.

The old contention still exists, as to whether the pupil shall have liberal, special training in subjects for which he exhibits special aptitude, or shall be rounded out and a harmonious development be secured by putting excessive effort and labor upon those subjects for which he exhibits great inaptitude. It would appear that if physiological psychology has demonstrated anything, it is that no amount of training will bring proficiency to the student in those fields for which he is unfitted by inherited and natural mental and physical characteristics.

The present state of industry makes a broad general education very desirable, but early specialization is even more desirable and necessary, and if this be done upon a scientific basis under proper advice, the paucity of farm laborers would be much relieved by recruits from the ministry and medicine. Our kitchens would be supplied with many good cooks from that over-crowded profession of poor musicians, etc.; thus much of the problem of the distribution and division of labor would be solved.

The courts are not yet conducted upon the plan of employing a disinterested, skilled neurologist to distinguish the malinger from the person suffering with a traumatic neurosis, an important matter in our present industrial condition.

The legal commitment of the insane is not upon the basis of justice to the afflicted person, or of safety to the people of his community. Responsibility in mental disease is a sealed book to the laity, is misunderstood by a majority of the legal profes-

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sion and many medical men; all of whom may lend their influence to secure the conviction of an irresponsible criminal, whose act should have been prevented by confinement in a proper institution.

Neurology should be made more prominent in the teaching of our medical colleges, and by so doing the diagnostic power of the physician could be improved, and he need not treat a case of exophthalmic goiter three months as an endocarditis or as albuminuria. He could distinguish an hysterical attack from angina pectoris, concussion of the brain from compression, a locomotor ataxia from neuralgia.

Mr. President and members of the Society, I have secured papers in this section to further elaborate some of these points.

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SOME MEDICO-LEGAL PHASES OF INSANITY.

C. N. JEPSON, SIOUX CITY.

Mr. President, and Ladies and Gentlemen:

It is a familiar maxim in law that the doing of impossible things is not required of anyone, and hedging about me so reasonable a protection, and one which I am sure will readily obtain before this body, I will state that this paper will be a misnomer of the subject as it appears upon your program.

The subject assigned to me, "A lawyer's view of the best method of testing a claim of insanity as a defense for crime," to my mind offers a subject incapable of being presented. It calls for the laying down of a rule or set of rules by which all cases of insanity in criminal cases might be determined. This is impossible, as no set of rules can be laid down or enunciated by which to determine a claim of insanity in all cases. Every case where the question of insanity is in issue must be determined upon its own facts and circumstances. To say that a set of hard and fast rules could be laid down to govern all cases, or in any given case, by which the fact of insanity could be shown or proven, would be like making a net of a certain mesh and with it expect to catch all fish. As well in your profession might it be said that after the diagnosis had revealed a certain disease that a certain remedy or treatment would alleviate or effect a cure.

Aside from the subject given me there are many interesting medico-legal phases of insanity, interesting alike to your profession and mine, but the space allotted to me for this paper and its discussion (and I will add parenthetically that I greatly fear it will not rise to the dignity of being discussed) forbids a very extended article on any of them. Insanity is a subject that should intensely interest both the law and medical professions, and induce discussion and mutual co-operation between the members thereof.

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Undoubtedly there are many abuses existing under our present system of proving insanity, for the purpose of avoiding a civil liability or for the purpose of causing the detention of insane persons in our insane hospitals or other places of incarceration, or again when insanity is set up as a defense for crime committed, which but for the fact of insanity would otherwise be punishable.

You all know what is commonly understood by the term insanity, and also know there are different forms, types and degrees of the same, but in a given case just where reason ends and insanity commences is ofttimes a most difficult and perplexing question, especially so when its determination must affect the life, liberty or property of one of our citizens, either as a defense for crime or where incarceration is sought.

All acts of men proceed from the mind, and we ordinarily look upon the intent as either good or evil, but upon being more minutely scrutinized we find varying degrees and forms of good on one side and evil on the other. In criminal law, or in the procedure to declare a person insane, the question of intent is not the same as in other departments of civil jurisprudence. In the instances I have mentioned, the state, in order to protect its citizens' safety, their property and society in general, is the plaintiff or the complaining party. It seeks no compensation of a pecuniary character for an injury to it. Its sole object and purpose is the punishment of wrongs committed against it, as well as the prevention of wrongs against it and its citizens or their property. It is apparent to everyone that it would result in no good, while it would be an act of oppression and injustice to punish or incarcerate one, who, misled by the light that nature and man gave him had, impelled by the purpose of what he thought to be a legal discharge of his duties, unfortunately done what under the real unseen facts was a technical violation of law. Thus in criminal law nothing which is not the outflow of a criminal mind is a crime.

There is no affliction or suffering that the human body is heir or subject to that is so terrible in its consequences or so pitiable to behold and nothing to be so dreaded as disorders of

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the brain, destroying the faculty to think and reason sanely and intelligently. Reason is the border between man and the brute. There is no affliction fraught with more cruel or disastrous consequences to the subject, his family, friends or the personal enjoyment of his property rights, and none that appeals more strongly to our pity and sympathies than insanity. It, and the study of it, should challenge the careful, conscientious and considerate thought of both your profession and mine, to the end that we may in so far as possible alleviate its terrors and that substantial justice may be done both to the suspect and society.

History of the past reveals a dark page with the olden way of dealing with persons of disordered minds and many was the outrage committed by boards of insanity or others having the duty of declaring persons insane, but the general advancement of civilization has wrought many beneficial changes. This leads us to a consideration of the present system in vogue in this state, and as to whether or not it is all that is desired or hoped for, and if not, in what manner or method may it be materially and satisfactorily improved upon? Let us deal with the way, in Iowa, by which persons may be adjudged insane. Iowa stands almost alone in her method of determining the question of insanity with a view of detention or incarceration. Massachusetts and possibly one or two other states have similar laws to those of Iowa.

Let us examine a portion of the statutes of the state of Iowa relative to the investigation of insane persons.

Our law provides for county commissioners of insanity, consisting of the clerk of courts, one physician in actual practice and of good professional standing in the community, and one lawyer in actual practice and also of good professional standing. This board has general jurisdiction and cognizance of all admissions to the hospitals or other places of detention, and also of investigating and determining whether or not persons are insane.

For a clearer understanding of the law, I will read Section 2264 of the Iowa Code, which is as follows: "Applications for admission to the hospital must be made in the form of an information, verified by affidavit, alleging that the person in whose behalf the application is made is believed to be insane, and a fit

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subject for custody and treatment in the hospital, and that such person is found in the county, and shall also state the place of residence of such person, or where it is believed to be, or that the same is not known, according to the facts."

In connection therewith and properly a part of the subject I will read Section 2265 of the same code, which is as follows: "On the filing of such information the commissioners may examine the informant and other witnesses under oath, and, if satisfied there is reasonable cause therefor at once investigate the grounds thereof, and may require that the person for whom such admission is sought be brought before them, and that the examination be had in his presence. They may issue their warrant therefor, and provide for the custody of such person until their investigation shall be concluded, which warrant may be executed by the sheriff or any constable of the county, or, if they shall be of the opinion from such preliminary inquiries as they make that such course would probably be injurious to such person, or attended with no advantage, they may dispense with such presence.

"In their examination, they shall hear testimony for and against such application, if any is offered. Any citizen of the county, or relative of the person alleged to be insane, may appear and resist the application, and the parties may appear by counsel, if they elect. The commissioners, whether they dispense with the presence before them of such person or not, shall appoint a regular practicing physician of the county to visit him and make a personal examination touching the truth of the information and his actual condition, who shall forthwith report to them thereon. He may or may not be of their number, and shall certify that he has made a careful, personal examination as required, and that he finds the person in question insane if such is the fact, and if otherwise, not insane; and, in connection with his examination shall endeavor to obtain from the relatives of the person, or from others who know the facts, correct answers, so far as may be, to the interrogatories hereinafter required to be propounded, which interrogatories and answers shall be attached to his certificate."

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There are provisions of the statutes providing for an appeal from the finding of the board, by any person, his agent, guardian or attorney, and may thus be tried anew. That is, one may be adjudged insane and then he may appeal, in order to have the question of his sanity gone into again and this in a proceeding without notice to him in the first instance.

There is a provision of the law authorizing a discharge from custody of the person so accused during his appeal, if such a course is deemed in their opinion expedient.

If a desperado commits a murder, robbery or other villainous crime, he is hedged about with protection afforded him by the sovereign power. If he is without means, he may ask and demand as a matter of legal right that the court appoint competent counsel to defend him to the end that he may have a fair and impartial hearing, for without such a hearing he may not be convicted. He must have due process of law. In many instances the best legal talent is appointed by the court for him and in the end he becomes a sort of martyr. And this is as it should be. It is the spirit of our constitution, and of every other state and of the union itself. It is the watchword of liberty. Is a suspected non compos mentis afforded the same rights and privileges under the laws of our state as the criminal in the case I have mentioned above? I regret to have to state to you that I do not think that he has.

You will readily perceive from a reading of the sections of the statutes that anyone may cause a writ de lunatico inquirendo to issue and have the question of one's sanity determined without an opportunity given to the suspect to be heard in opposition thereto. All that is necessary after the information or application is filed is for the board to examine the informant, and others if they see fit, and if satisfied that there is reasonable cause, proceed to investigate the grounds thereof. You will have noticed there is a wise and liberal provision in the section above quoted which provides that such board may require the suspected person brought before them, or according to their whim, caprice or sweet fancy they may dispense with such presence. Does this breathe the spirit of our constitution, or even smack of our boasted personal liberty?

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The board shall hear the testimony of any citizen, if any offers. for or against the application. What a legal farce! Of course, it will be suggested that the remedy of appeal is secured to the adjudged insane.

Will that bring him back his former reputation, his friends and peace of mind? It is a serious thing to be accused and tried as being insane, and when once the investigation is started the damage is done. The benefit of an appeal would afford about as much remedy and satisfaction as a man would have in trying to gather together his house in tangible shape after it had been blown to the four winds by a tornado. This right of appeal and its benefit reminds me of a circumstance that happened in the town near where I was raised. In a game of poker, one of the players applied to another of the players a vile epithet which cast grave suspicion upon his maternal ancestry. He promptly resented it by knocking the fellow down and loudly demanded that he retract his vile reflection. The party knocked down scrambled to his feet and said he would retract and would have been d—d glad to do so before he was hit, if only asked to.

The statutes provide anyone interested may appear for the accused, but suppose the case is where the accused is not even required to be present. He may be a stranger in the community, or he may have no friends who will interest themselves on his behalf, or in the controversy.

The board, whether they dispense with the presence of the suspect or not, must appoint some regular physician, who may be one of their own number, to visit the accused to make an examination of the truth of the information and make report to them. The physician so appointed is not required to disclose the object or purpose to the suspect. He need only ask the questions required by statute and make report to the board and he has done his duty. It is true, he may examine others, or relatives of the accused, but they may be prejudiced against him or have conspired to have the very thing done. What could be expected of them when examined by the physician? The physician may not be to blame, for he may not be in a position to know or to determine the truth or falsity of their statements

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How many physicians are there in this body who would be willing to have some physician, selected at haphazard, to visit them to determine their sanity and make report thereon to the board? This physician may not be a skilled alienist or neurologist. The statute does not require him to be one or the other. I do not mean to impute that our boards of insanity act corruptly, but I do say that they could and no doubt act many times to the great detriment and injury to others when there is no intent on their part to do wrong. No sane person can afford to have his sanity questioned on an lunatico inquirendo even though the finding is that he is not insane. Suppose that one is incarcerated as being insane who is not; that fact alone would be sufficient to break down the last remnant of reason in many persons.

It would seem that our supreme court has held that one may be adjudged insane without his presence before the commissioners of insanity, and that the question of insanity is a medical fact. This was so held about 1890 in the case of Chavannes vs. Preistly, reported in the 80 Iowa, 316. With the ruling that the determination of insanity is largely a medical fact I have not much to quarrel about, although the supreme court does not say in what way or manner it shall be proven, but I do not believe the principle is sound that a person may be adjudged of unsound mind in an ex parte hearing of that question. Dear to my mind is that old familiar safeguard and maxim, that no man can be deprived of his liberty or property without his day in court.

The Preistly case has been vigorously assailed by the courts of last resort of other states, with the exception of Massachusetts and one or two other states where our rule obtains.

Another thing in our law that seems repugnant to me is that it is only necessary for one physician to make the examination, and that physician too may not even be an alienist or neurologist, for undoubtedly nearly all findings are made upon his report and recommendations. As for the other two members of the board, the clerk of courts and a lawyer, neither of whom, the chances are, know anything more about insanity than the ordinary layman.

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Under our present system too much conjecture may be indulged in, and irreparable injury done, and that too, without adequate redress to the injured party whose sanity may have been the subject of investigation, brought about by the maliciousness of an wholly irresponsible person, or it may have been done in good faith but without sufficient grounds, but once started, like the prairie fire its damage is not ofttimes easily remedied.

It seems to me that natural justice would require that the suspect, or some one appointed to act for him, should be notified of every step taken to ascertain whether he is insane or not. That he be advised of every step taken against him and be given every reasonable opportunity to defend, and this should be done no matter how violently insane he may be. This is asking no more for him than is accorded to every petty criminal. Why should he not have the benefit and opinion of an alienist or neurologist, if he is unable to procure their services himself?

Gentlemen, it seems to me there is room for some improvement along the lines I have suggested, and our professions should take common ground thereon, actuated by an unselfish desire to see natural justice done to those who may be suffering from or accused of this dread disease, than which there is no other that so surely blights or so dreadful in its effects.

Discussion on the Paper of Mr. Jepson.

DR. C. F. WAHRER, of Fort Madison.—*Mr. President:* I do not like to be seen on the floor so often, but I felt that this paper might not be discussed. It is one that deserves to be discussed, and many of the points mentioned in it are too sadly true. When a man can be deprived of his liberty and stowed away in some insane hospital because some physician has adjudged him insane, it is absolutely wrong. Some other men ought to determine whether that man is insane or not.

Now, with reference to the physician himself: There are very few physicians in this city or any other who really can stand before a court and give an acceptable definition of insanity. What is insanity? I have seen it tried time and again. Very

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few men can give the different classifications of the various forms of insanity. They cannot tell the difference between an hallucination and when a man is under the influence of liquor. Perhaps there is no difference. They cannot tell the difference between paranoia and progressive dementia, and this is no reflection on the profession of this or any other state. I have made these remarks to emphasize the point that no one man's judgment ought to be taken as final when you and I can lose our liberty by so doing and be stowed away in one of these places stigmatized as lunatic asylums. It is not right. There ought to be a board of competent persons appointed for this purpose.

A short time ago, it is said that a certain gentleman was anxious to see really how the inmates were abused in insane asylums. In order to test this matter, he played the insanity dodge, was actually brought before a commission, and "sent up." After being there a while and observing how the insane were treated behind bars, he was given a hearing before three doctors as to his sanity, and I want to tell you that they said he was insane, and he is still there. This is not a suppositious case. This man, I know, is just as sane as any of the rest of us. An investigation of this kind shows how easy it is to convict a man who may be a little mixed up in his mental condition, or who may depart from the usual normal condition, whatever that may be. You can readily see how easy it is to get a man in such a place and how difficult it is to get him out. It is usually more difficult in other countries, where they have insane asylums, of which Charles Reade has given us horrible examples. There should be some measures devised whereby more competent men can pass on a man's sanity or insanity. The line between sanity and insanity is oftentimes extremely hazy. You have heard time and again of people who suddenly surprised others in their neighborhood by their actions, men, perhaps, who have lived clean and decent lives, and all at once the people are startled by some of their peculiar doings and actions. Perhaps a clergyman has fallen, and later he commits some overt act or some crime. The people are ready to say that such a man has incipient insanity.

I wish to emphasize the point brought out by our legal

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friend, who has contributed such an admirable paper, that we should have different means before sending a man to an insane hospital. I feel very strongly on that point.

DR. A. J. HOBSON, of Hampton.—I take exception to some of the statements made both in the paper and in the remarks of Dr. Wahrer. Very few people are adjudged insane when they are not. Of course, some people get so crazy that their neighbors cannot tolerate them, or they commit some overt acts which make it possible for them to get into an asylum. We have a competent physician at the head of the asylum in this state, and there is no trouble at all for a man if he proves to be sane. He is not deprived of his liberty for any definite time. He is not sent there for treatment if he is not insane, and the physician at the head of the asylum has the power to discharge him at any time he is cured. So I take just the opposite view to the sentiment that has been expressed. There are dangerous men all over this country whom I have known to go before a board of commissioners and were judged sane when they were insane. They ought to have been in asylums, and in the course of a few months they proved by their own actions that they ought to have been there. I think the commission errs on the side of leniency rather than otherwise.

DR. FRANK A. ELY, of Des Moines.—I feel that it is obligatory on the part of some one in a measure to defend the insane commissions. After having been engaged for two years in actual work among insane patients at Clarinda, I had the opportunity of examining every man who was admitted to that institution, and in the two years that I was engaged in that line of work I cannot remember a single instance in which anyone was sent to the hospital who did not at one time or another during his stay prove that he had been justly committed.

DR. D. C. BROCKMAN, of Ottumwa.—I do not think Dr. Wahrer is aware of people being sent to an insane hospital. I want to object to the word insane asylum. We have no such a place in Iowa. We have insane hospitals for sick people, and I do not think that Dr. Wahrer is aware of their being sent there without due process of law. The laws in Iowa are as just as in

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any state in the Union, and I have investigated the laws of every state. There is no place where the interests of the people are as well protected as in Massachusetts and Iowa.

The essayist, in speaking from the standpoint of an attorney, does not realize the importance of taking violent cases of mania before a commission. At any rate, he does not realize the importance of it as much as those men who have treated these cases for twenty-five years, particularly the importance of taking cases of melancholia before a commission. That is one of the wise provisions of the law that an injured mind shall not be more violently injured by taking the person before a commission where more harm would be done. It would be just as illogical and harmful to take a man with a broken leg and have him walk to the hospital or to the office for an examination, as it would be a crippled man. These patients should be protected from injury in having them appear before a court. I have seen many cases in which very great blunders have been made by taking insane patients into court. These patients are always hurt by such a course. There has not been a case of insanity sent to the insane hospital in Iowa in the last twenty-five years who was not insane. The question has been raised of the difficulty of getting patients into such institutions who are insane, rather than getting patients into them who are not insane.

DR. D. W. CROUSE, of Waterloo.—The essayist stated that patients are put in an insane hospital by *ex parte* investigation; he did not say that the commissioners are not partisans in the hearing of cases to determine whether they are insane or not. What I have in mind is this: First, we have the examining physician; then there is a physician on the board also who hears the testimony and with whom you can talk, who has had the opportunity to examine the case. If it should so happen that some one is sent to the insane hospital without there being any evidence of insanity, the superintendent, or those who have charge, can dismiss him, so that people are surrounded with many safeguards, and I think our friend over here (referring to Dr. Wahrer) must be a little put out because he did not serve as a commissioner of the insane, or he would not talk in that way.

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DR. W. VAN WERDEN, of Des Moines.—There have been many things said in the discussion today that are really laughable. In the first place, the standpoint taken by Mr. Jepson in his paper is certainly reasonable, from a lawyer's standpoint. There are some things in the paper that are true, and others that are a mistake. There is no insane commission I have ever seen but what will give the patient the benefit of a doubt. There is hardly any patient brought before the commission unless it is some one who has just been taken up, and nothing is known about him, or no history is given, but what evidence must be furnished before they are instructed to file their information. After the information is filed, if there is any question about it, the parties are entitled to any number of physicians which they wish to employ to examine them. The commission is careful to subpoena everyone who knows anything pertaining to the case. Should they not be satisfied, and there is still a doubt, after they have heard the physicians who have examined the patient, they are very apt to discharge the patient, with the instruction to watch him, and if anything occurs, later on, to refile their information, but for the present they prefer to discharge him. As to the parties being properly defended, we had a strong indication of that with the Wilcox family. We found not only two boys crazy, but the mother and father, and everybody connected with them were much on a par. They secured the services of one of the best attorneys in Des Moines, who defended their cases. There was no qustion about these people being insane, and the probabilities are that they had always been insane. They were paroled. My experience has been that in Polk county they are too apt to let them out. Scarcely a month has rolled by in the past two years that there have not been cases returned to the insane hospital that should not have been let out. If there is any error committed, they are too lax in paroling them before they really ought to be. One of the Wilcox brothers was paroled on account of his father's death. They read the Declaration of Independence, commencing with the performance about eight o'clock in the morning, and kept it up until it became dark. They were so annoying that the neighbors insisted upon putting a stop to it. This man has been

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running around, and we have heard from him in different parts of the country. He is about by authority of the board of control. If there is anything to be done, he will be returned by the board of control who turned him loose. After complaints were made by several people, who feared that their lives were endangered in Des Moines, by these people, the other brother was taken to the capitol building, and while there he did some very rank work in the way of fighting, demolishing things, etc. He was taken back to the hospital and, I believe, is there at the present time. The probabilities are that it is an incurable case. If there is any mistake with the law, if it errs as to the commitment or deprival of liberty, it errs in dispensing with these people or in paroling them. It is rare, however, that the board lets them out before they should be. It is true, there may be medical men on the board who are not competent, and may probably err; but I do not believe there is anybody sent to an insane asylum who is not insane. If they are, certainly they would have very little or no trouble in getting their liberty. The fact still remains that there are no positions to which physicians are appointed but what we will find instances where those physicians are not as competent to fill the places as are some others in the community. This is unfortunate, but it can never be avoided. Such things will always happen. Care should be taken in selecting a man in the community for that purpose, one who is competent. It is true, there may be some improvement made in the law, but on the whole, the law is rather acceptable.

DR. CLIFTON SCOTT, of Des Moines.—There are one or two points I would like to speak of in connection with this paper. I think the remark made by the gentleman from Hampton, that these people are sometimes liberated too early, is evident, as cases of homicide, etc., that have been committed. The point the writer of the paper made in the early part of it, that no set of fixed rules for testing insanity can be laid down, goes without saying, but that a method better than we now have could be placed upon the statute books is equally true. I read a paper on this subject, which was published in the proceedings of last year. All of these cases should, out of respect to the patients, and not to do them further injury, be settled by a competent

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board of alienists, or made up of our superintendents of insane asylums, men of competency and experience. Take the patient in private and settle the question without any legal open testimony in court, and have their decision in the matter accepted.

MR. JEPSON (closing the discussion.—I do not know, gentlemen, that I care to say anything in addition to what I have already said in my paper. I am glad it has been discussed. The difficulty with the gentlemen who have spoken is that they say there have not been any cases where injury has been done. I know to the contrary. That is not the point. The fact that it has been done is no reason why that method should still be continued. Let us take this kind of illustration, and the law is clear and plain. Supposing I am a physician who is upon the board; I may not know anything about insanity to speak of; I am able to make an investigation of the case, and upon my report the board acts. I want to tell you that is not right, and you know it. That is the reason why I suggest two or more skilled specialists who shall make an examination and report themselves. One man may be mistaken; he may err, and his opinion may be actuated by spite and malice. Damage is done. What does it mean to adjudge a man insane? The presumption is that they shift the burden. Every man is presumed to be sane until the contrary is shown; when this board makes its findings, that presumption is overcome, and the man has the burden of proving himself sane. That is what I am objecting to. We should have a board. There should not only be one, but more; some one should act for the party supposed to be insane. I would appoint some skilled alienist, and let him with the other member or members of the board, if necessary, go out and investigate him, in order that justice may be done. I, like many of you, believe there are many people who should be incarcerated who are not. But that is not the question. That is not the point at issue.

In regard to the suggestion made by Dr. Scott, it is a good one, with reference to proving insanity in all cases. It is largely a medical question. Eminent men should be obtained to pass upon that question whose judgment would be good, who are capable of making a thorough investigation of the mental condition of the case or cases, and their decision should be accepted

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by the court as determining the fact. While it is true, the neighbors and others may give valuable testimony, as to whether a person is insane or not, that can also be given to the board.

I do not mean to antagonize the medical profession; I want the men in your profession to determine this question; that is what I am working for. They are more competent than anyone else to do this. I do not like the method we have at present. The ordinary criminal accused of a crime may get the most eminent counsel to defend him at every stage of the proceedings. What is necessary in cases of insanity? They can dispense with his presence if they think it is necessary. That does not appeal to me as being right and just; it does not to you, and you know it.

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THE RELATION OF CHILDBEARING TO INSANITY.

ARTHUR S. HAMILTON, M. D., INDEPENDENCE, IOWA.

"I do not know of any event that can occur in a family, short of death, that is so great a shock to all who have to do with it as for a new-made mother of the first-born child to become suddenly maniacal and require to be sent to an asylum. One of the most joyous times of life is made full of fearful anxiety and the strongest affection on earth is then often suddenly converted, by disease, into an antipathy." (1)

Thus does Dr. Clouston, one of our foremost alienists, speak of insanity connected with childbirth.

The frequency with which such cases are met in practice makes their consideration a matter of importance to general practitioners. Heretofore, it has been quite common to group under the name, puerperal mania, all cases of insanity connected with the childbearing function, but lately there has been a decided tendency to limit this term to those cases occurring during the puerperium and in addition, to speak of insanity of pregnancy and of lactation. It must be clearly understood, however, that this classification is simply one of convenience and not any one of these terms indicates a special and characteristic form of insanity. Almost any one of the many different forms of mental derangement may be present at these times in a woman's life, her condition being merely an exciting cause. If labor were the sole factor, we would expect to find in such cases no hereditary predisposition, but, as a matter of fact, this is very prominent in the great majority of instances. Indeed, it is only in rare cases and under extraordinary circumstances that childbirth and its attendant conditions bring on an attack of insanity in a previously thoroughly well-balanced mind. Hereditary predisposition then must be assigned as *the* predisposing cause. It is not necessary that there should be actual insanity in the ancestry—a condition of mental and nervous instability in the parents mani-

1. Mental Diseases, Clouston, p. 347.

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fested in such ways as chorea, paralysis, epilepsy, alcoholism, etc., gives the faulty foundation to the child. Primiparae are more likely to become insane than multiparae for obvious reasons, and to an even greater degree is this true of those who are illegitimately pregnant. Clouston (2) says that insanity is twice as common in illegitimate as in legitimate pregnancies and Fordyce Barker (3) states that one in eighty of the women delivered at Bellevue become insane, and attributes this high percentage to the fact that so many women there are unmarried. In true puerperal psychosis, sepsis is thought by some to play a very important part and this argument is upheld on the basis that as the septic complications of labor have gradually declined in recent years, so also have puerperal psychoses lessened in frequency. It is quite as likely, however, that the decline is much more apparent than real. The insanities of childbirth, being no longer recognized as distinct forms, have failed to appear in statistics as such. In addition to sepsis, prolonged labor with severe complications, great loss of blood, the sight of a dead or deformed child, or fright induced in other ways, are all exciting causes. In the insanity of lactation, prolonged nursing is undoubtedly a most important factor. In a woman already anaemic and worn out from numerous preceding pregnancies and years of unremitting work, nursing is carried on month after month when her strength is scarcely sufficient to perform her daily tasks, to say nothing of nourishing her child. It is significant that lactation insanity is much more common among the poor than among the rich and presumably well nourished, while puerperal insanity is about equal in the two classes.

Of the three varieties mentioned, insanity of pregnancy is most rare. In Aschaffenberg's cases (4) from Kraeplin's Clinic and in Tuke's statistics, (5) they comprise about twenty per cent. of the cases. It is doubtless the experience of everyone who has much to do with obstetrics that pregnant women usually manifest some mental change, yet this rarely goes on to insanity.

2. Ibid, p. 351.

3. New York Med. Journal, 1872, vxi, p. 449.

4. Allg. Zeitschrift für Psychiatrie, 1901, viii, 2 and 3, s. 337.

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Strange likes and dislikes, unnatural craving for food and drink, unstable mental conditions and even changes in disposition and in the moral attitude are often encountered. Occasionally, but not usually before the middle or latter part of pregnancy, a condition of mental depression appears which may go on to a complete loss of interest in everything, including husband and children and finally result in attempts at suicide. In twenty-eight cases given by Tuke, (5) twenty were melancholy or melancholy and demented and practically fifty per cent. were suicidal, the latter certainly being a very high percentage of suicidal individuals. Sometimes these symptoms disappear before the pregnancy is completed. More often they persist until after the delivery when they either disappear or are likely to change into a more violent psychosis.

The following record of a woman admitted at the Independence State Hospital, some time ago, shows a fairly typical case of insanity in pregnancy:

Case No. 1—Female; age 46; a farmer's wife and a native of Denmark. Family history negative except that the father died of pulmonary tuberculosis. Nothing is known of the patient's own history previous to her marriage at twenty-five. She has eight living children; one died in infancy. Her labors have not been difficult. Five months after becoming pregnant with her eighth child, she had an attack of illness of uncertain character. When this had lasted six weeks, symptoms of mental trouble began to appear. She was unable to attend to her household duties, became confused and talked disconnectedly. Had delusions and hallucinations of sight and hearing. When her baby was born, she insisted that it was not hers. Afterwards, seemed to realize that it was but did not care for it. When admitted at the hospital, three months after the birth of her child, there was little or no improvement. She was weak and nervous and said she was always tired. Complained of a sense of heaviness in the top of her head. Had a torn pelvic floor, slight cystocele and a bilateral laceration of the cervix. She had some insight and

5. Edinburgh Med. Journal, 1864-5, x, p. 1013, and 1866-7, xii, p. 1083.

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knew that she was not well mentally. Said that others had told her that she would be well as soon as her baby was born, but this had not been true. At times would cry. She remained at the hospital five months, during which she was a good deal depressed. Complained of pain in her head and at times would say that something was going to burst her head open. There was very little intellectual impairment. At the end of five months was discharged as improved but not recovered.

Of the three forms, puerperal psychoses are most common and of Aschaffenberg's (4) and Tuke's (5) cases, they comprise almost fifty per cent. The distinction between these and the lactation psychoses, however, is only an arbitrary one as they gradually fade into each other. During the first week following delivery by far the greatest number become insane, and in a study by Clouston of sixty cases eighty per cent. were found to have developed in the first two weeks after labor. The onset is sometimes very sudden and unexpected, but more often there are premonitory symptoms, and one of the first of these is the loss of power to sleep. Insomnia coming on in a puerperal woman should always arouse suspicion. The insomnia is likely to be followed by a change in manner and the patient becomes neglectful of her child and her household work; strange and unreasonable dislikes appear; she is suspicious and distrustful and finally hallucinations and delusions develop, and she presents a typical picture of the most violent form of mania. Her dislike for her child becomes so great that she not infrequently attempts to take its life and there are frequent outbursts of anger accompanied by the use of the most profane and obscene language. Attempts at suicide are common. Often the patient refuses to eat and forced feeding becomes necessary. Along with these mental symptoms, there is also rise of temperature and pulse; suppression, partial or complete, of lochia and of milk; scanty urine and coated and tremulous tongue. Occasionally the symptoms take on a depressive and melancholy form, but this is uncommon except late in the puerperal period. The following case is a type of this variety:

Case No. 2—Female; age 24; native of this country. Family history negative. At sixteen she had "ulceration of the womb,"

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was very cranky and was considered "out of her head." Has always been quick-tempered. Was married at twenty-two and her married life has been pleasant. For the last month of her first pregnancy was constipated and had dysuria. Labor was difficult, instruments were used and there was considerable laceration. For some hours after the birth of her child, it was thought she would not live. Five days afterward, she began to talk incoherently. On the eighth day, the lochia stopped. She had a high fever and became delirious and sang in a loud voice for two or three days. Refused to eat and drink and imagined her husband and sister were trying to poison her. Would not converse with anyone but continued to talk and sing in a loud voice. Had hallucinations of sight and hearing and well-marked delusions of grandeur. Said she was Jay Gould's wife, that she was the leading lady of the land. At first seemed fond of her baby but later would pay no attention to it at all. When admitted, she was very anaemic and weighed only 72 pounds. There were extensive lacerations of the cervix and of the floor of the pelvis. Her delusions persisted and she gradually passed from a condition of mania to one of dreamy confusion. She improved quite rapidly, however, both mentally and physically and in about three months was discharged as considerably improved. It has been learned since that she is now entirely well.

Midway in frequency between the insanities of pregnancy and the puerperium stand the lactation insanities which constituted about thirty per cent. of Aschaffenberg's (4) and Tuke's (5) cases. This form usually appears from five to twelve months after confinement and the symptoms are more often those of depression than those of excitement, though either may be present. The history of the case given below shows quite well the effect of nursing a child, combined with trouble and the exhaustion of severe physical labor, though it will be observed that even in this instance there is an hereditary predisposition which in itself might well account for much of the woman's condition.

Case No. 3—Female; age 26; farmer's wife; native of Wisconsin. Father intemperate, and maternal uncle and aunt insane. Personal history negative up to sixteen years of age, when she had a severe attack of the grippe, following which she was al-

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ways rather nervous. Was married at nineteen and has had four children. After the birth of the first child she was somewhat excited but no mental disturbance followed the births of the second and third. After her fourth labor, which occurred eight months previous to her present admission, she did not seem quite right; was easily worried and complained of pains in her head. When the baby was three months old her husband became ill and she was compelled to care for her children, do her household work and manage the farm, including milking eleven cows night and morning. After a month of this work she lost her appetite and began to have vague fears as to what would happen to her in case of her husband's death. Two months later some of their stock died, seriously impairing their financial condition, and she then began to have frequent attacks of crying. Said she had to cry but would give no reason for doing so. Later she ceased to show any interest in her work, would start to do something and then stop before its completion, weeping and saying, "I can't do my work." All this time she was nursing her child, and as it was in poor health she lost a good deal of sleep in caring for it. Finally she would do no work at all, paid no attention to her children, was disinclined to speak and would not even dress or undress herself. At night she would frequently start up crying out that the pigs and cattle were out. When brought to the hospital, shortly after this, she had well-marked hallucinations of sight. Would lie quietly in bed with her eyes open yet seeming not to see. Refused to speak. She was anaemic, poorly nourished, and somewhat jaundiced. The heart sounds were weak and the pulse 130. Her tongue was deeply coated and she was constipated. She gradually improved and soon began to reply fairly well to questions, but was emotional and frequently cried. It seemed very difficult for her to fix her mind on anything. At the end of one month seemed practically well but a relapse occurred and she again became drowsy and depressed, but subsequently improved and at the end of four months was discharged as cured.

As regards the preservation of life, the prognosis is always good in all three varieties except in certain cases of furious delirium with considerable rise of temperature, when exhaustion

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occurs rapidly and death is likely to result. The outlook for the mental condition is also good if one includes all of the mild cases, many of which last only a few days and very few of which ever come under the care of the hospital physician. In the more severe cases which come to the hospital, the prognosis is very much the same as in another case of the same form of insanity due to other causes. Even where there is full recovery, however, there is often a recurrence at a subsequent pregnancy. The recovery rate for all forms is often placed as high as seventy or eighty per cent., but this is certainly too great; many being classed as recovered who are really only very much improved. Before making a prognosis in any given case, it is well to look carefully into the family history, the previous condition of the patient and the form of insanity as well as the history of the present attack. In this connection, it may be worth noting that some have held that pregnancy exercises a favorable influence on pre-existing epilepsy. For this view, there is no foundation whatever, except that the fits sometimes cease, partially or wholly, during the pregnancy. It is well known, however, to all practical alienists that any intercurrent disorder in the life of an epileptic is likely to result in a temporary cessation of the fits though there is no permanent benefit. Thus the amputation of the toe of an epileptic will often produce quite as much apparent benefit for a time as the trephining of his skull. In other pre-existing insanities, pregnancy exercises an unfavorable influence and there is no good reason to believe that epilepsy is any exception to the rule. It seems scarcely necessary to state that even if pregnancy did exercise a favorable influence on insanity, a proper consideration for the unborn child would forbid a marriage taking place under such circumstances. I know of no statistics which show that the outlook for a child born of an insane mother is worse if birth takes place during an acute outbreak of the insanity than during the interval, but it would seem on general grounds that such would be the case.

The treatment of these cases, both preventive and curative, is most important. During pregnancy, the hygienic measures ordinarily recommended should be strictly carried out. Excitement and all sources of annoyance should be avoided as far as

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possible and plenty of sleep should be had. If insanity appears in the course of a pregnancy, the question of an abortion may come up, but it should be dismissed as something calculated to do more harm than good, at least to the mother. Usually, it will not in any way improve the insane condition and it may only make it worse. In addition to looking carefully after the general health of the patient, she should have careful nursing, pleasant society and possibly change of surroundings. When insanity appears in the puerperal state, the child should be at once removed, both on account of the inadvisability of permitting it to nurse longer and also on account of the constant danger of it being killed by the mother. From the mother's standpoint, insomnia is one of the most difficult symptoms to combat, and for this hypnotics should be freely given. Indeed, by means of administering these early, an attack of insanity can sometimes, no doubt, be prevented. There are many drugs that may be used for this purpose, but chloral hydrate and sulphonal in doses of twenty to thirty grains and hyocine hydrobromate in doses of 1-100 to 1-50 grains are best. It is well to bear in mind that the insane require much larger doses of sedatives than can be administered with safety to those who are sane. If suitable appliances are at hand, a hot bath at a temperature of from 80° to 108° F. and continued for twenty minutes to six hours will often induce quiet sleep without the injurious effects of a drug. In order to administer these baths and to do the tube feeding which is often necessary, and to properly care for the patient in other respects, a nurse suitably trained in the care of the insane is just as necessary as a general hospital trained nurse is for the care of a surgical case. A nutritious diet with stimulants should be administered regularly and if the patient refuses to take these, as is not infrequently the case, the stomach, or preferably the nasal tube, should always be used. Usually after one or two feedings the patient will take nourishment without any further trouble, but in some cases it is necessary to continue the feeding for some time. If skilled nurses are not at hand, the physician should always be present at the time of the feeding. Laxatives are often required and as the fever which is frequently present is not rarely due to or associated with genito-urinary complications, these

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should be carefully examined for and appropriately treated. In this connection, it must be constantly borne in mind that insane people cannot be depended upon to call attention to their own needs, and will bear the most painful conditions without giving any sign of their presence.

In the lactation psychoses, in most cases, the general health is most disordered and treatment therefore should be directed toward this. Nursing should be stopped at once, and by means of rest and nutritious and concentrated diet the strength should be restored. Suitable tonics are also of service along with good nursing, cheerful surroundings and plenty of fresh air. In any of the three forms where there is much depression deodorized tincture of opium in doses of 20 to 30 minims, three times per day, is highly recommended. Suicide is a thing which must be carefully watched for in all cases and, on this account, only the most trustworthy nurses should be employed as its prevention requires the most constant vigilance and even the best of nurses are sometimes outwitted. Whether it is best to send a patient to a hospital for the insane depends upon circumstances. In mild cases lasting only a few days it is probably unnecessary, and in the severe cases of profound sepsis and marked delirium where a fatal result only can be anticipated from the outset, the friends will usually prefer to have the patient remain at home. Besides, an exhausting ride of many miles to a hospital may have destroyed whatever chance for life the patient had. And even in any case, however troublesome, if enough skilled nurses can be employed the treatment may be carried out at home as successfully as in a hospital. It is certainly true, however, that a great many more people suffer from being sent to the hospital too late, when all hope of cure is gone, than suffer from being sent there at too early a period.

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ACUTE AND CHRONIC ALCOHOLISM.

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ACUTE ALCOHOLISM.

In the study of alcoholic insanity it is well to have before us a picture of those who use alcoholic stimulants to excess, but who, with comparatively few exceptions, are not treated in hospitals for the insane. From their ranks ultimately comes an endless procession of the insane, while some who are not insane find their way to the hospital.

Some drink liquor because their forefathers drank it and because they have been trained to drink it from childhood on without a thought as to the consequences, and without a knowledge of the fact that it is a toxic agent. Others drink because they feel that their muscular powers are increased thereby, contrary to fact. Many drink for the pleasure it affords them. They learn that even a small quantity of alcohol causes a feeling of exhilaration. They become less constrained and speak and act with more freedom; are more courageous and feel possessed of greater ability and greater physical power. If they go to further excess, as almost invariably follows, they become more communicative and boisterous, the finer sensibilities that formerly held them in check disappear and they have less, or even no regard for the rights of others; they make themselves conspicuous, even forcing their attentions on those about them and interfering in every possible way; becoming finally profane, obscene or insulting. If held to account for their behavior by the offended, their anger is suddenly aroused, they fly into a passion and commit some rash act without regard to the consequences. If the poisoning by intoxication continues, delusions and hallucinations more or less transitory develop; great mental exaltation is sometimes present and not infrequently the climax is reached in an attack of acute delirium, accompanied, occasionally, in a short time by exhaustion and terminating in death.

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Group of Chronic Alcoholics in the Independence State Hospital.
They are the cases reported in this paper. A few cases reported are not illustrated in the group.

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The abnormal mental manifestations clearly indicate that there are serious physical disturbances. The toxic agent, alcohol, has disturbed the vital functions, otherwise the normal mental balance would be preserved. Accordingly, the alcoholics are observed to finally become sleepless and nervous. Motor restlessness follows; the face takes on a worn and anxious expression and the superficial vessels of the face and of the conjunctivae dilate. The appetite fails and there is sometimes a very great loss in weight. Emaciation becomes extreme in some cases. During each period of intoxication there is experienced a feeling of increase of muscular strength, but after the period has passed it is noticeably decreased; occasionally so much so that the patient cannot even walk. Later on tremor of all the muscles, the so-called alcoholic tremor, makes its appearance. The tremor, either fine or coarse, is best observed in the tongue and extremities. Alcoholic neuritis is rather rare, but was so well marked in one case that there was a complete loss of sensation in the legs. This patient received extensive burns on the feet without any consciousness of pain. Months passed before the sensations were restored.

Two of the cases of acute alcoholism were studied in the Independence State Hospital and the following symptoms were noted: One was perfectly oriented at the time he was received and continued so. He acknowledged that he used liquor to excess and that he did things he ought not to have done, but he positively denied suspicions of any kind, also delusions and hallucinations. His memory was good, he was bright and showed an average degree of intelligence. He had at intervals, for two years past, threatened to kill his wife during and after his periods of intoxication. Sometimes as he was in the act of retiring, he would draw his knife, open it, and say to her: "I will murder you." At other times he would say, "I will get the gun or razor." He would sit up in bed with the open knife in his hand for an indefinite length of time, after making threats, and finally fall asleep with it in his hand. These acts and sayings were often repeated. He made hideous noises. He developed delusions that dead men were lying just outside the door; that someone was coming through the window after him; that his wife was associating with five devils. He said, "Come to my bosom so

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I can murder you. I will kill you because you are with the five devils out there." No one was present with her except the children. He started to carry out his threat, but his wife made her escape to a neighbor. He then wreaked vengeance by bursting out windows and by bursting open doors. He also saw vermin crawling upon the wall. When sober he was always kind to his wife and children.

Others are affected somewhat differently. In the height of the intoxication they are no longer able to hold the thread of thought; their conversation is senseless jargon; they stammer; all their movements are interrupted; they stagger about and at last become helpless. Their mental activities cease and they lapse into an unconscious state and are as completely anaesthetised as if ether or chloroform had been given.

One patient thought, after passing through such a debauch, that he could never meet his friends and relatives again; that if he did they would ignore him. He then thought to end it all in death, but failed. He was released from the hospital as not having been insane, after the self-inflicted wounds had healed. One patient recently admitted into the Clarinda State Hospital had terminated his debauch in acute alcoholic delirium, one of the gravest complications in connection with alcoholism, since, in this country, it so frequently results in death, or, if the patient passes through the delirium he is most often left with permanent mental impairment. He recovered from the delirium, but very marked mental deterioration followed. One case of acute alcoholic delirium received still later died of exhaustion on the seventh day after admission.

CHRONIC ALCOHOLISM.

At about the time the patient approaches the border line between sanity and insanity mental retrogression begins. Mental concentration cannot be maintained for so long a time as when the mental functions were normal. There is no longer a desire nor an inclination for creative mental work. Original work is finally an impossibility; the intellectual powers come to a standstill and the judgment declines. The memory begins to fail and knowledge of new things, if acquired, cannot be retained so well. Even the events of the past connected with the patient's own life

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appear before the mind as distorted and indistinct pictures. This mental weakness now gives way to strange false ideas which gradually become more exaggerated and increase in intensity. The nature of those who are so unfortunate as to become addicted to alcoholism is entirely changed. They are easily angered over trifling affairs; are cross and irritable, and become suspicious of their nearest relatives and their best friends. They very often suspect their wives of infidelity without the slightest ground. The wife of a patient expressed her sympathy for a hard-working neighbor who lived across the street. The patient replied by saying, "You had better go and help him." The response was, "I could do it with a good heart." In speaking of this later, the patient said, "That was the first that set me on." From that time on for three years his wife could not go out to make calls or to do shopping during the day or go out of doors in the evening for even a few moments without being accusd of being in the company of this man and of having improper relations with him. He would even see her rush out of the house at night for the purpose of meeting him in the yard. Twice he saw them in a compromising position upon the floor in his own house. He secured a weapon, an iron rod, hurried to where they lay with the avowed purpose of taking both their lives. He raised the weapon and was making ready to strike the blow when thoughts of a motherless son came into his mind. These thoughts caused him to lower his weapon and walk away without molesting them. He said, "The boy is all that saved them." He also developed a delusion that his wife wanted to get him out of the way and even saw her stand before him with a butcher knife in hand ready to stab him to death. So harassing did his behavior become that it was necessary to commit him to the hospital. Previous to the onset of the insanity he thought there was no better woman than his wife.

Another patient, after using alcohol to excess for seven years, became very much interested when the battleship Maine was destroyed; worried much, and, after a few days had passed, developed the delusion that the government held him responsible; that President McKinley and Sagasta used him as a tool and that if he could only extricate himself from that situation the whole trouble would end. He said, "The image of Sagasta was brought

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right before me. I saw just how he looked and communicated with him. He did not speak aloud, but in my mind I spoke to him. He spoke to me in the same way. Four times I heard a voice say, 'He did it! He did it!' meaning that Sagasta blew up the Maine. When the Maine was destroyed I received the impression that Sagasta sent her down. Then I met him and he told me he caused the destruction of the Maine. The next impressions came when the men were before Santiago. McKinley or I told them to do certain things and they won the battle. McKinley appeared twice to me, once in my sleep. He came right through the door and stopped on the sill. He was determined to have my deposition and I would not give it. Since then I have been hounded, as I would call it. I was drawn and at times they emaciated me and reduced me by their will power. My temples seem to be sinking in, and it is this very thing that makes my head shake so. I know this is all caused by McKinley because I have heard the words, 'How do you like that, old man?' I resist all these influences by firing back my thoughts. Just now my head begins to ache. My sanity is all right. Sagasta wants my life. He wants a double life, and if he killed me his life would be doubled and he would then be able to recover the islands. McKinley threatened me and got me to say the Maine was destroyed by torpedoes. Voices said to me, 'Keep still! Keep quiet!' I received these thoughts and know they came from McKinley. He got it out of me by will power. He wanted to use it against the Spaniards. Just now I heard a voice say, 'Speak the truth, man, for the truth will come out.' My mind leaves the body and goes out into space, has done this a great many times." He also communicates with persons far away by means of a system which he describes as telephoning without wires. He also developed the idea that on account of some physical deformity his wife was not a suitable mate for him. He wrote her to that effect. Soon his hatred for her knew no bounds, and finally while she was visiting him, he told her that he would kill her if he ever got out of the institution. After she was gone he said, "She will not live one month after I get out of here." He told her that the devil had come to America; that even McKinley and the republican party had leagued themselves with the devil, and that she had done the same thing. He said to her, "It is

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pretty strong language, but you know it is God's truth and so do I. I feel that this country is ruined. God is not with McKinley, nor is he with the administration. I know I am doing right. I know I was taken in. I know that God is with me, and I know that I will have to live a different life in order to overcome this affliction. I am in enslavement. You know I have been deprived of my personal liberty. You ought to be willing to give me justice and liberty or inform me why you keep me here." Later he thought royal women sought matrimonial alliance with him and said, "Eighteen women are married to me. They marry themselves to me. They are women who rule destiny. Yesterday eight Pharos, men, yes men, married themselves to me." One of the latest and perhaps the most painful of all his delusions was the belief that the ground upon which a picinc was held had a dynamite mine under it. He refused to go for the reason that if he did go the superintendent and assistant physician would cause the mine to explode. These mental symptoms are all still present and there is marked mental retrogression, which has become more noticeable from day to day until the present time. He is no longer able to recollect his thoughts so well as formerly, cannot concentrate so well and is losing interest in his work. He is still willing to do whatever is asked but he does not do it so well.

Another patient, editor, lawyer and author, while in a hotel in Boston became possessed with the idea that he had incurred the enmity of some men there; thought they were toughs, and in a short time began to hear voices in and about the hotel at night; heard voices in conversation about him, calling him names and abusing him. He got up, went down to the bar room and said to the landlord and all present, "You are talking about me. I heard every word you said. What do you mean? They denied it. I went back to my room. In the morning while shaving I heard voices under my window saying, 'I wish he would cut his throat!' I took my rapier, went out and found no one there." He thought that men followed him on the street; that they took kodak pictures of him and that they were writing scurrilous articles about him. He then went to Washington to escape his tormentors, but they followed him. He saw the chief of police but could get no satisfaction. He then boarded a train and went

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to a distant state, and when he arrived at his destination he saw nude men standing on the platform. He went to a hotel, told the landlord what he had seen and that he should be on his guard because a mob was likely to come at any time. He made one more effort to escape from his enemies. He went to Chicago, and while speaking of his experience there he said, "The same things occurred. I found the people there to be human vultures. I went to the chief of police and told him about the persecutions to which I was being subjected. He told me I had delusions." He was then taken into custody and to a hospital.

Another patient cannot understand why he is brought to the hospital, and immediately afterwards he said that he could hear voices talking to him all the time. The voices told him to put his shoes on and his tools in his tool sack, (he was a miner on the western coast), go out of doors and stand there; then to run down the street and go into a house, but before he got there the voice told him to go no further but instead to run away; then to run first one way and then another, and then to stand still; all of which he did. He tried to escape from these torments by going from one place to another, but wherever he went and whenever he saw persons singly or in groups he would see them making the "signs" and hear them talking about him and saying, "Don't you know the sign? Are you in it? Are you in it? I don't see how you can live." He said, "Mobs followed me as if I was the only man in the world who had money." He went to a city 1,500 miles away, remained two years, yet he heard the voices, saw the "signs" and still believed that the mobs were after him. He again tried to escape by going to a distant state, but failed as before. Later he drifted into this state and into the hospital.

Some carry weapons about with them and actually shoot at their imaginary enemies, and sometimes even shoot down their friends and relatives whom they regard as their enemies. Others think they are possessed with devils; that the devils take up their abode in their bodies; think that vermin and even animals are within their bodies, perhaps in the stomach or bowels; think the beer or other liquors which they drink or the food which they eat is purposely poisoned by their enemies; imagine that the

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house is burning down and that they cannot escape; or perhaps, if out of doors, that everything is on fire and that flames are all about them. They see the devil and other hideous forms. They see rats coming up through holes and running about on the floor; see lizards and snakes running about on the ground. One patient saw snakes and frogs raining down. The air was full of them and they were crawling and leaping everywhere.

One patient, at first, saw God and conversed with him. Later he thought the world was about to be burned; that his house and everything about him was on fire. To quench the flames, he rushed about with a hand sprinkler in one hand and a bag with some salt in the other. He sprinkled the water and threw the salt on everything. He thought he was safe as long as he had salt and water. He also thought all the dogs he saw were devils, begun to wage war on them and nearly exterminated them from the neighborhood. He thought he could see devils in the air in swarms like bees, thought they were getting into his ears, and to prevent them from doing this, he plugged his ears with cotton; thought the devils were trying to smother him and in order to prevent their doing this he would try to blow them away by forcing air through his nostrils; thought also he could smell them.

Sometimes the devils appeared to him to be as large as cattle and he thought they were trying to kill him. He showed signs of great fear and kept lamps burning all night for the purpose of preventing them from coming into the house. Finally the devils came into his room and he rushed out to get an ax with which to kill them.

Another patient thought his coffee was drugged and said that he could taste the strychnia which had been put into it; thought the liquor which he kept in his own house was poisoned by enemies who came to his house; that they had also strewn poisonous powder upon his bed while he was away. Finally he heard voices about the house at night and then began to think that his neighbors and everybody about him were murderers. His disposition changed; he became quarrelsome and was taken into custody and sent to the hospital. These delusions persisted and similar ones made their appearance from time to time.

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Others, when they develop the delusion that they are being hunted down by their enemies, hear them saying, "There is the rascal! Tar and feather him! Shoot him! Hang him! Burn him at the stake!"

Not a few, being unable to rid themselves of these torments, seek relief in death by their own hands in various ways.

The physical disturbances are in the main identical with those described in connection with acute alcoholism. In chronic alcoholism, they become more exaggerated and in addition there is in a very great number of cases extensive arterial sclerosis and chronic nephritis. Contracted liver is much less frequent and occasionally a case of general paralysis is met with.

Diagnosis—Having the mental and physical pictures of both acute and chronic alcoholism before us, the diagnosis as a rule is quite easily arrived at. It can nearly always be confirmed by a history of excessive alcoholism.

Etiology—In addition to excessive alcoholism, in the nineteen cases studied, for periods of time varying from five to fifteen years, there were in seven cases the following ascribed causes: In one case, the mother had heart disease and the father paralysis; in two cases, a sister of each was insane; in one case, the father was an alcoholic, finally became unbalanced mentally and later a hemiplegic; one paternal aunt died with apoplexy. In one case, both parents used intoxicating liquors. In one case, the patient was a seven months child and lay apparently in an almost lifeless condition for two months, after which time he became active, grew quite rapidly and appeared to be a strong and healthy child, but was small and remained undersized all his life.

Treatment—First, removal of the patient to a hospital or to some retreat where total abstinence can be maintained is of great importance. Second. the use of such supportive treatment as may be indicated in each individual case. Third, massage and inunctions of some nutrient oil, in certain cases where there is much emaciation, loss of strength and nervousness, give very satisfactory results in connection with the supportive treatment. Fourth, suggestive therapeutics is recommended by some and its value cannot be questioned. I doubt if a physician ever prescribes for a patient without, either consciously or unconsciously,

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sending along with the prescription a large element of suggestion; otherwise the patient would soon discontinue his services, saying that he had no faith in that doctor. Of all patients, alcoholics are the most susceptible to suggestion, and a step farther than unconscious suggestion may be taken with good results. Fifth, hydrotherapy as devised and put into practice by the great psychiatric, Kraepeline, of Heidelberg, Germany, is coming to be regarded more and more as a most important adjunct in treatment. This method of treatment is in constant use in the hospital for insane in the above named city and the results obtained are most flattering, not only in the treatment of alcoholics but in the treatment of other forms of insanity. With its proper use, restraints and sedatives are almost entirely done away with in the former named hospital, and a much larger percentage of acute delirium cases recover than anywhere else in the world.

Prognosis—In the first class of cases, acute alcoholics, recovery is almost always certain. They will as a rule remain so permanently, if they can be induced to desist from using any kind of alcoholic stimulants. The moral degeneracy, however, which is so easily acquired by all alcoholics and which as a rule remains as a permanent inheritance, increases the possibility of a relapse, makes it almost certain. In chronic alcoholism, the prognosis is unfavorable. Some recover if treatment is begun before the delusions become permanently fixed and before mental retrogression has set in or is at all far advanced, but a large proportion of them relapse as soon as they meet with temptation. There is almost no hope for permanent recovery in those cases in which mental deterioration has become very marked and in which the delusions have become fixed. Of the fourteen cases of chronic alcoholism illustrated, all but one showed very great mental deterioration, while the five acute cases showed no such failure. The average time in the hospital of the nineteen cases was two years and eight months. The shortest time for any one case was seven days, at the end of which time death ensued. The longest time for any one case was six years.

Argument for detention and treatment—The alcoholic, acute or chronic, is a menace to the peace, to the welfare and happiness of the community in which he happens to be a resident. Often

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uncouth in his appearance, he leaves a lasting and unfavorable impression upon the innocent youths who know him and unavoidably meet him. His vocabulary is as a rule made up largely of obscene and profane words. He is much freer in the use of profanity in his own home than anywhere else. Not only does he use such language, but he speaks gruffly to the members of his family and often curses them and even strikes and kicks them. He comes into his home, which is cheerless and without comforts, simply because he has squandered his earnings for liquor instead of supplies as he should, and because his home is as it is and because food is not prepared as he desires it should be, he beats his wife and turns her and all the family out of doors. They perhaps escape to a neighbor's house, while, he, conqueror as he feels himself to be, seeks to avenge himself still further by overturning tables, breaking dishes and destroying furniture. Then, satisfied with his heinous acts, he retires with clothes and boots on and sleeps the sleep of the wretch that he is. Finally, he comes to look upon the members of his family and his neighbors as his enemies. He arms himself and threatens and often does shoot these supposed enemies. Cases are on record where friends and relatives have been shot at and injured and even killed in this way. One of the cases studied, carried a revolver with him while at work in his field and finally shot his hired man, whom he thought had become his enemy, without warning. Another case prowled about his house and out-buildings at night with revolver in hand and kept up a fusilade at imaginary enemies, thus endangering the lives of passers by and the lives of his own family. Another walked into a room where his father was, brandished a butcher knife, and said, "I ought to kill one before I go." Another struck his wife on the head with a meat ax and nearly caused her death. I witnessed another alcoholic get up from the dinner table in his own house, raise a butcher knife over his wife, and, looking like a demon from the infernal regions, threaten to stab her to death on the spot.

Such outrageous acts from the least to the greatest should not be tolerated by the innocent members of a family nor by a community. Such a man ought to be taken into custody at once and removed to a proper place for care and treatment, and there

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should be no great hurry in making him a free man again unless the home and the community are safely guarded. This could be accomplished in a measure by legislation, such as would give us laws preventing the marriage of those habitually addicted to the use of alcoholic stimulants; laws making acute and chronic alcoholism good ground for divorce. But the law should not stop there, as good as such laws may seem, it should go a step farther; it should look to the welfare of the race—to its future. It should not allow these alcoholics to propogate their kind, for such propogation by these alcoholics, these moral degenerates and physical wrecks, contaminates the life stream and insures the premature death of the race. Such propogation is a crime against our race—a crime against our twentieth century civilization. What sane man or woman, if she or he thoroughly understood that about one-half of all the living children born of alcoholic parents in Germany become epileptic, and that about one-third of all the imbeciles and idiots are the direct offspring of alcoholic parents, would think of sanctioning such propogation? I trust, not one. They should avoid union with the alcoholic and such propogation with more dread than they would union with a leper. They should understand that we on this side of the water are no exception to the rule; that alcohol is as far reaching in its effects upon us as it is upon our kindred race across the sea. They should demand laws that would compel the life retention of such alcoholics, or laws that would compel the administration of such treatment as would prevent them from reproducing their kind, and yet leave them able to live useful lives.

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TRAUMATIC NEUROSES.

FRANK A. ELY, M. D., DES MOINES.

There are few physicians of any professional standing who are not from time to time called upon to appear in court for the purpose of giving an opinion with reference to the probable extent and possible duration of physical injuries alleged to have been sustained by some person as the result of carelessness or negligence on the part of another. It is therefore the desire of the writer in presenting this paper to bring up for discussion a class of nervous phenomena which as a rule follow traumatism, and are so frequently the grounds upon which damage suits are instituted.

The term "traumatic neuroses" is a generic one, which of late years has been applied to a variety of nervous symptoms commonly noted as a sequel of accidents of different kinds, during which physical injuries may or may not have been sustained. These accidents, as a rule, are of the sort which cause great jarring and vibration, especially of the head and spine, and are also the occasion of intense fright and mental strain. Owing to the frequency with which this class of neuroses follow railway accidents, and because of the predilection of their symptoms for the brain and spine, the terms "railway brain" and "railway spine" have become fixed in the popular nomenclature of the legal world, and are recognized to some extent by the medical profession. These unscientific terms are very misleading, since experience has demonstrated that accidents of all varieties and of varying degrees of severity may be responsible for the initiation of these nervous phenomena. So simple an accident as falling from a hammock not infrequently occasions nervous conditions fully as grave as those brought about by more frightful disasters, and equally grave conditions may follow intense fright, during the experience of which the body has received no jarring or concussion whatever.

Traumatism in its original meaning implied physical or bodily injury resulting from violence of one sort or another;

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hence the word "traumatic" used in connection with those nervous conditions following accidents, during which no apparent bodily injury has been sustained, would seem to be a misnomer. We must not forget, however, that the psychic man is as real as the physical man, and that any sudden deleterious influence causing psychic disturbance in one who has previously given evidence of sound mind and stable nervous organization may be looked upon as traumatic, even though we may be unable to find a dislocated cell or a fracture nucleus in the tissues of the brain or cord.

As the result of the very imperfect knowledge of the functions of the nervous system, and an extremely meagre understanding of the most simple psychic phenomena, many physicians of the past century were inclined to go to one extreme or the other in their opinion with reference to the position which the traumatic neuroses should hold among the mental and nervous diseases. A large number were inclined to look upon persons suffering from these disorders as malingers and simulators, while others held the opinion that in nearly every instance there are physical lesions of greater or less severity, and laid great stress upon severe concussions and jarring of the central nervous system as the most prolific cause of the disturbance, believing the molecular continuity of the nervous system to be disarranged as a result of excessive vibration. This difference of opinion with regard to the true severity of these cases has led to a great deal of discussion among the most able scientists in this and other countries, and while there are yet many points upon which the minds of the medical profession are not wholly united, I believe that the majority are ready to hold that most of the cases of nervous disturbance following traumatism and fright are the result of true diseased conditions, either physical or psychical, and not the result of deliberate attempts at fraud.

Under the general head of traumatic neuroses we recognize with Osler three classes of cases:

1. That class in which the symptom group is not essentially different from that of neurasthenia of the cerebrospinal type resulting from causes other than traumatic. To this class has been given the specific name of "traumatic neurasthenia."

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2. That class in which there is an underlying profound emotional disturbance, accompanied by many other ear-marks of hysteria. This class has received the name of "traumatic hysteria."

3. That class in which the symptoms are less inclined to conform to any definite type, but in many instances are strongly suggestive of organic disease of the central nervous system. Of late years this class has been robbed of many of its important symptoms, as a consequence of our better knowledge of the hysterical anaesthesias and paralyses, which were orginally looked upon as being of organic rather than functional origin.

In the foregoing introductory lines the etiology and pathology of the traumatic neuroses have been incidentally referred to, but a little time may be profitably devoted here to the assembling of a few facts which observation and clinical experience have been the means of demonstrating in this connection.

As the term implies, we look upon traumatism and fright as the essential exciting causes, but it is only reasonable to believe that there are numerous predisposing causes, in the absence of which these neuroses would not follow in the footsteps of minor injuries and periods of emotional excitement. The heritage of an unstable nervous organism as the result of weak and diseased parentage naturally lays the offspring liable to fall an easy prey to the influence of shock or traumatism. Previous environment has much to do with preparing the ground for a rank development of psycho-neurotic symptoms in those who happen to be subjected to the proper exciting causes. Putnam calls our attention to the frequency with which traumatic hysteria occurs in persons whose social sphere has been extremely limited, and whose mental horizon has not been extended by education or by actual contact with the cosmopolitan world.

Self-control, an exceedingly important prophylactic attribute in this class of disorders, can only be gained by contact with circumstances which constantly occasion a demand for the exertion of the will, and where this faculty has never been developed, or has undergone the atrophy of disuse, it is not strange that suggestive impressions induce hysterical symptoms. A lack

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of self-control probably has less to do with predisposition in cases of traumatic neurasthenia than in traumatic hysteria, yet it undoubtedly plays even here a very important part.

The influences of environment at the time of an accident are fully as important as those exerted before. Our attention is called to the fact that few cases of post-traumatic neuroses are noted as the result of accidents sustained upon the football field or during the pursuance of the ordinary dangerous occupations. We are all perfectly familiar with the severity of the blows and impacts received under such circumstances, and the absence of nervous sequelae forces us to the conclusion that the mental attitude of the person at the time of accident has much to do with the precipitation or prevention of subsequent nervous disorders.

Subsequent environment is alike influential in this respect. All have observed the deleterious influences exerted over hysterical patients by the sympathy of over-zealous friends. Where could a better opportunity be presented for a susceptible person of slender means to make his or her debut as the star actor in a hysterical farce-comedy than when made the hero or heroine of some accident, the responsibility for which is placed at the door of some wealthy corporation? Again, how favorable are such surroundings to the production of morbid nosophobias of the neurasthenic, who above everything else needs to have the mind diverted into pleasant channels extraneous to self.

Chronic intoxications and other debilitating influences may be in part responsible for the production of neuroses; yet are more apt to lend a hand in producing true degenerations of the brain and cord.

As regards actual pathology, there is little ground to doubt that microscopic lesions may be present in cases which are unattended by any gross lesions of the spinal column or cranium. One able neurologist has made the following assertion:

"There can be no doubt that injuries, even of moderate severity, such as falls, unattended by fracture, are capable of causing actual lesions of the nature of minute hemorrhages, necrosis of nerve elements, and perhaps of important and widespread vaso-motor disorders and vascular degenerations."

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He further states that "the usual outcome of these lesions is, however, either in recovery or else in recognizable forms of inflammatory or degenerative processes, rather than in the neuroses and psychoses, properly speaking; though it occasionally happens that typical psychoses and neuroses constitute the only manifestations of such lesions."

Osler cites several cases as reported by Leyden, Edes and Bernhardt, in which the symptom-complex of traumatic hystero-neurasthenia followed accidents of slight severity, and finally resulted in death. In one case a spinal pachymeningitis was found. In four cases degenerations of the pyramidal tracts were demonstrated. In two cases marked arteriosclerosis of the brain and cord could be shown, and in one of the latter cases a beginning multiple-sclerosis was also detected. In none of these cases was there external evidence of traumatism, and in all save the one showing the pachymeningitis the brain and spinal cord gave macroscopic evidence of being in a normal condition.

The four cases reported by Edes manifested a marked general tremor, and the symptoms followed immediately upon the traumatism.

Such cases as these just cited are very rare. Very few afford the opportunity of a post-mortem examination, because death is seldom the result of morbid conditions of this character. Osler states that no case of the kind with post-mortem has been recorded in this country, and it is his belief that the development of symptoms strongly indicating organic changes in the nervous system are quite exceptional, he himself never having encountered such a condition.

Instances in which traumatic neuroses of one form or another have followed mere fright or terror, without any bodily injury whatever, are quite numerous. The symptoms are frequently profound and lasting, and may be as severe as in those cases where the attending circumstances would lead to a stronger suspicion of organic trouble.

Time will not permit any rehearsal of the symptoms which may be met with in typical cases of post-traumatic neurasthenia and hysteria, since they differ in no essential particular from those encountered in cases dependent upon other causes. Partial

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or total loss of consciousness is frequently the immediate result of the accident, or the patient may be greatly agitated and excited; while not infrequently a condition of mental stupor is induced. Among the most interesting cases are those in which the injured person is calm and apparently undisturbed for hours or days after the receipt of the shock; but after the storm is over suddenly show marked and profound hysterical or neurasthenic symptoms. The condition just mentioned shows that the clinical picture immediately following an accident is not always indicative of the kind or severity of the symptoms which may develop later on. After the first few weeks, if recovery has not taken place, the patient settles down into a chronic psychoneurotic condition, the symptoms of which conform in greater or less degree to one of the classes previously mentioned.

As has been stated, the symptoms of the third class do not strictly conform to any given type of disease. In fact, this group includes those cases which cannot be placed under the head of neurasthenia or hysteria, and oftentimes are strongly indicative of organic disease. In this group we often find an odd mixture of hysterical and neurasthenic symptoms. In some instances the superficial emotional tendencies of hysteria are in abeyance, yet there may be anesthesias, paralyses and contractures. If to these hysterical manifestations be added the tender spine and general irritable weakness of the neurasthenic, we have a disorder in which it is quite difficult to make an accurate diagnosis. In this class, also, would come those cases in which minute multiple hemorrhages and slight degenerations have taken place in the central nervous system. Undoubtedly these cases are accompanied by symptoms of considerable gravity; yet our knowledge of the effect of such lesions is at present insufficient to enable us to give any definite prognosis with respect to the duration of the morbid symptoms which they occasion. Those who have given the most careful attention to the matter seem to be of the opinion that the prognosis in these cases is no more grave than in cases where such lesions do not exist.

Aside from the neuroses which have just been discussed, we have a number of true organic nervous disorders which, it is thought, may be precipitated by traumatism or mental shock, and which must be excluded before we fall back upon the less

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satisfactory diagnosis of traumatic neurosis. Many persons are naturally predisposed to organic nervous disease, and the latent morbid tendencies are smouldering away from year to year, only waiting to be fanned into a flame by some extraordinary drain upon the nervous energy, similar to that brought about through the agency of some accident or excessive mental strain. As examples of these diseases we have tabes, general paralysis, neuritis, syringomyelia, exophthalmic goitre, epilepsy and chorea. Typical psychoses may also be developed in like manner.

From a medical-legal standpoint the matters of diagnosis and prognosis in this class of disorders are of considerable importance, and are worthy of our most careful consideration.

With reference to diagnosis, the chief points to be considered are as follows:

1. The possible presence of gross physical injuries, such as contusions and lacerations of the muscles of the back, fractures, or dislocations of the vertebrae, and cranial fractures causing pressure or inter-cranial hemorrhage.

2. The possible indications of organic disease of the central nervous system.

3. The possible manifestations of true neurasthenia.

4. The possible appearance of the symptoms and stigmata of hysteria.

As a rule, litttle difficulty is experienced in determining the presence of gross physical lesions similar to those mentioned above. Contusions and lacerations of muscular tissue have their own symptoms and prognosis. Fractures and dislocations of the vertebrae, with few exceptions, produce pressure upon the cord causing symptoms of myelitis, varying in degree of intensity in proportion to the amount of pressure or destruction of the cord. Cranial fractures, causing pressure as a result of depressed bone or cortical or extradural hemorrhages, are not apt to pass unnoticed, and the pressure symptoms are so plain that little difficulty should arise here.

The second point to be considered is much less easy than the first. The indications of organic disease of the central nervous system are not always thoroughly marked. Our knowledge of the motor and sensory tracts in the brain and cord en-

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ables us with a reasonable degree of certainty to place our mental finger upon the lesions which cause an obstruction to the outflow or inflow of impulses along their paths, but there are some of the classical nervous disorders, such as chorea and paralysis agitans, which have their characteristic train of symptoms, and yet are little understood as to the pathology which is underlying them. This makes it obligatory upon the diagnostician not only to be familiar with the symptoms which may be traced to definite portions of the brain or cord, but also to be acquainted with the manifestations of many other diseases which the clinician alone has been able to map out for our guidance. A careful study of the electrical reactions, trophic conditions of the muscles and skin, reflexes, rectal and vesical sphincters and special senses, combined with a thorough investigation of the muscle thermal, pain and tactile senses, will enable the examiner to determine quite certainly the presence or absence of gross degenerations in the cerebrospinal axis. If he will then go a step further and by careful deliberation exclude those classical disorders which are known chiefly by their characteristic symptoms, he will have brought himself to a point where he must discriminate between three morbid conditions, viz: multiple hemorrhages and degenerations in the brain cord, neurasthenia and hysteria.

As our knowledge of the distribution and exact influence of the minute lesions first mentioned is not at all definite, and since such lesions are held to be insignificant as to prognosis, the diagnostician may as well content himself with the none too easy task of differentiating between traumatic neurasthenia and hysteria.

Modern scientists are inclined to look upon neurasthenia as a fatigue neurosis, and, indeed, clinical experience bears out this theory in all essential particulars. Holding in mind, therefore, the irritable condition of the nerve centers and their low stock of potential energy, it will be much easier to recognize those symptoms which stand out so plainly in the case of most neurasthenics. A general irritable weakness of both mind and body, giving rise to fatigue, headaches, loss of mental activity, sleeplessness, hyperaesthesias, etc., unaccompanied by real anaesthesias, paralyses and contractures, will cause a marked depression of the diagnostic scale beam upon the side of neurasthenia.

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With reference to the recognition of traumatic hysteria little need be said. The previous history, more particularly with reference to the emotional nature of the patient, taken together with his or her environment preceding, at the time of, and subsequent to the traumatism, should point out the possible predisposing influences; while the presence of any of the accidents or stigmata should place a diagnosis upon a reasonably sure footing.

The matter of prognosis in this class of cases is in reality the most important part of the subject, since it most heavily bears upon the legal side of the question. We may say that the gross physical injuries previously indicated have their own prognosis, founded upon more or less definite clinical experience, and the courts are seldom at a loss with reference to the disposition of cases founded upon grounds which are so obviously just. The organic nervous disorders and those of classical type, which are sometimes precipitated by traumatism, likewise have their prognosis based upon extensive clinical observation.

The prognosis in traumatic neurasthenia depends largely upon the age, environment and general physical condition of the patient, taken together with the gravity of the symptoms which follow in the first few weeks after the accident. A young person who has previously enjoyed good health, and whose condition shows marked improvement within four or five weeks, will almost certainly regain perfect health. Older persons, or those past middle life, especially those who are not ordinarily strong and robust, are apt to suffer from the effects of their nervous breakdown during the rest of their lives. Where the sufferer is a person of considerable means and is able to bear the expense of prolonged rest treatment, or of a sea voyage, etc., the prognosis is much better than it would be in a like case where lack of money prevents the following out of a line of treatment which has proven to be so highly beneficial.

It is impossible to enumerate all the contingencies which may influence the physician's prognosis in cases of this character, but in a general way it is safe to say that cases of profound neurasthenia following traumatism, in persons past middle life, or in younger persons who show no tendency toward improvement at the end of two months, necessarily carry with them a bad prognosis as regards complete recovery.

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Traumatic hysteria has no definite prognosis. The recovery of damages after a period of litigation, or the settlement of a suit one way or the other, often has a decided curative influence; not because the plaintiff has willfully endeavored to rob the defendant, but because the suggestive influences of our court rooms, physicians and over-zealous friends have been removed. Complete recovery, however, is not always brought about in so simple a manner. Many persons have suffered throughout their whole lives from the hysterical taint which has gained entrance to their psychic life as the result of shock or sudden fear, and as a consequence have made life miserable, not only for themselves and their friends, but for the physician who has been unfortunate enough to have gained their confidence.

As a rule, the prognosis in this form of hysteria is much better than in neurasthenia, and because of the possibility of a removal of the symptoms after litigation has ceased, the expert must necessarily be guarded in his prognosis. It should be borne in mind, however, that hysteria, while it exists, is truly a disease, and is worthy of recognition as such. In point of fact, there are few physicians who would not rather have a wife or a sister sustain a half dozen fractures in preference to the induction of profound hysterical tendencies.

In conclusion, the writer wishes to place special emphasis upon the following points:

1. That nervous symptoms similar to those met with in traumatic hysteroneurasthenia may be noted as the result of sudden and intense mental strain, unassociated with traumatism.

2. That clinical experience and a few isolated post-mortem findings indicate that microscopic lesions of the brain and cord may result from traumatism without external evidence of violence.

3. That although we know these minute lesions are often present, our knowledge of their effect is as yet insufficient to enable us to differentiate between cases in which they do or do not exist, and that their possible presence does not necessarily influence our prognosis.

4. That hysteria must be looked upon as a true disease, which may be brought on by traumatism, and which may bring more trouble into a home than a broken limb or a sprained back.

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EPILEPSY; ITS NATURE AND ITS TREATMENT.

GERSHOM H. HILL, M. D., DES MOINES.

HISTORY.—Epilepsy is a disease of the nervous system which is as old as the human race. It is not restricted to civilized countries nor to people possessing a highly developed nervous system, but is known to all conditions of mankind. It was so named by the Greeks, because the patient is suddenly and unexpectedly "seized upon." He screams as if frightened, becomes unconscious, falls helplessly, struggles in a mysterious manner, froths at the mouth, becomes relaxed, breathes stertorously, and looks as if he was about to die. But in a few minutes or in a few hours is restored to his former condition and to his usual frame of mind. He resumes his duties as though nothing had happened. It is not strange that the ancients believed that an evil spirit caused this affliction. We still say that a patient is *attacked* with pneumonia or erysipelas, or with some other acute disease. Since the manifestation of epilepsy is periodic, and since there is more or less mental derangement present, these, also insane persons were called *lunatics*. There are still people who study the twelve signs of the zodiac and manage their affairs accordingly, hence, it was not strange to suppose that the moon has some influence upon human beings to cause these fits and periodic manifestations of mental derangement. This disease is so common and so persistent that physicians everywhere have had good opportunities to study and to treat it. As yet, comparatively little progress has been made in determining the nature of epilepsy and how to cure it. The predisposing and the exciting causes of epilepsy are various and complex, but with the latest methods of the clinical study of disease, and by the co-operation and perseverance of scientific men, I believe that cases of epilepsy will be carefully classified according to causes and to pathological conditions, so that by giving judicious, discriminating and continuous treatment to children and others during the incipient stages of the disease, epilepsy will be prevented and cured in a large proportion of cases.

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DEFINITION.—"Epilepsy is a disease of the nervous system, characterized either by frequently recurring convulsive attacks, with loss of consciousness, or by partial manifestation of these symptoms, or by psychopathic substitutes, concomitants, or results." Transient loss of consciousness without convulsive seizures is known as petit mal; the loss of consciousness with general convulsive seizures is known as grand mal; localized convulsions without loss of consciousness, are known as Jacksonian epilepsy; periodic confusion of mind instead of a fit is called a psychic equivalent.

"Careful observation has shown that neither falling nor convulsion is a predominant or even dominant characteristic of the disease, common as each feature is. It has also shown that the attacks which constitute the malady present variations, so great, both in degree and in character, as to baffle every attempt to frame a clinical definition. A pathological definition is that epilepsy is a recurring, sudden, brief discharge of nerve energy in some part of the cerebral cortex, not due to the normal cause of such discharge. The sudden liberation of nerve energy in the gray matter of the cerebral cortex occurs in epilepsy without the normal stimulus." "The function of the nervous system, and especially of the brain, depends upon the capacity for instant release of nerve energy. The instantaneous reflex action, the instant bounding away of a frightened animal for example, prove that the gray matter must hold nerve force *almost* released." "The point for us now is that the nerve force must be ready for instant release in the gray matter. Whatever its source, it must be held in a state of most delicate equilibrium by the restraint which keeps it unreleased but ready." "But this involves a conception of extreme *delicacy of adjustment* between the chemical relations—the tendency of the atoms to unite in fresh and closer combinations and release their latent energy, that is, their surplus motion—and the attraction which keeps them from so doing. It makes it easy to conceive that the slightest deviation from the normal relation between the atoms and the molecules may bring these into a position in which the equilibrium is suddenly overturned, and a quick combination and sudden release of energy occurs. We can understand that this may be

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from that marvelous inherited tendency which produces such precision of correspondence between parent and child in the process of nutrition, or that it may be the result of acquired causes, from the sudden shock of a concussion, mental or physical, or of a cerebral lesion which has slightly, but only slightly, implicated the gray matter in a certain part of the cortex. Indeed, when we consider what the state of the nervous system must be in its natural function, we cease to wonder that many persons become epileptic without any traceable cause, and our marvel is that all persons are not liable to such fits."

"But another equally important fact must be recognized. The liberation of nervous energy involves the escape of some atoms of the nerve tissue which are at once replaced from the plasma adjacent to them under the mysterious *nutritional influence* of life. The rearrangement is the same, and yet not quite the same. It differs in just the degree and character to make the same release of nerve energy more easy. Every action paves the way for its own recurrence. The effect is greater the more frequent its occurrence. This is the secret of the acquisition of skill; it constitutes the physical basis of memory; it is this which facilitates the repetition of a given morbid process, and this causes the recurrence of discharge which makes epilepsy a persistent disease. The recurrence of attacks is one great feature of the previous attacks. Every fit is in part at least the result of epilepsy, and the recurrence is in great measure the result of those which have preceded it, and in part a cause of those which follow it. Hence the immediate cause of the first fit must be regarded as the cause of the disease, although the essential cause is the disposition, that is, the state of nutrition which makes such discharge possible. When equilibrium is unstable, a trifling influence may overturn the balance, and cause an effect quite out of proportion to the apparent cause. The degree of instability may, of course, vary; and when it is not great the first attack may have been due to some cause of considerable power. Even then, however, we must ascribe the special effect to the special predisposition." Epilepsy is a habit.

"It is not customary to include under the term 'epilepsy' active progressive brain disease, such as tumor, even though it

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cause epileptiform convulsions. But there is a large class of cases in which an old spot of disease induces such discharges, which may be slight or local at first, but spreading when more intense, and ultimately leaving a general disposition which may be hardly distinguishable from idiopathic epilepsy. Although these cases are quite distinct in primary causation, they are not practically separable from those of idiopathic epilepsy.

CAUSES.—Epilepsy and insanity certainly run together in families. The child of an epileptic parent may become insane, and vice versa. Both diseases tend toward degeneracy and the extinction of the individual and of the disease. One-third of the cases of epilepsy are chargeable to heredity.

"Age has a great influence on the production of epilepsy. This may, indeed, be expected from the tendency to spasm and convulsion which is conspicuous in childhood, which lessens as the stability of full development is achieved, and is again increased during the change with which the period of childhood ends. The periods of this change, and of the first three years of life, are those in which epilepsy most frequently commences. In the second decade, indeed, the malady commences as a continuous disease in no less than half the cases, in the first decade in more than a quarter; thus three-quarters of the cases of epilepsy begin before 20 years of age. The third decade is responsible for a sixth, leaving only one-twelfth to commence after 30 years of age. But the persistently recurring fits may begin as late as 70 years of age. Yet, only one case in 200 commences after 60."

"Injury in or near the motor cortex may lead to recurring convulsions; but these begin in particular parts which correspond to the position of the lesion. These cases are rare. In some cases, however, general convulsions, like those of idiopathic epilepsy, follow some more general concussion which has possibly a widespread influence on nutrition. Yet it must be remembered that injury involves a mental as well as a physical shock, and mental shock, as will be seen, is a potent cause of epilepsy."

Toxic influences are occasionally met with in this disease. "A first fit may occur during or immediately after scarlet fever.

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In rare cases, some other toxic state of the blood, like that of alcohol, is the apparent cause. In obtaining the history of cases, we learn that occasionally the first fit was preceded by fright. In many instances the cause of the alarm seems absurdly inadequate; but that which seems inadequate at first sight may not seem so on further consideration. Mere minuteness of excitant, becomes unimportant if it act like the spark in an explosion of gunpowder; and it must always be kept in mind that the essential cause is the internal predisposition."

One sex is about as likely to have fits as the other.

In discussing the etiology of epilepsy two years ago, Dr. Frederick Peterson said: "It is in the domain of causes that we must now do our best work. We have already arrived at certain valuable conclusions. We know that heredity plays a large part in the etiology of epilepsy. There is, perhaps, no disease in which the workings of heredity are more striking. Epilepsy is one of the equivalents in polymorphic heredity. By this we imply that when the nervous mechanism governing the normal evolution of both body and mind is disarranged, the result is a condition of nervous instability which manifests itself in the descendants in some one of many forms. The result may be epilepsy, chorea, neurasthenia, hysteria, somnambulism, migraine, feeblemindedness, idiocy, insanity, inebriety, criminal tendencies, or simple eccentricity. These are called hereditary equivalents, and any of them may appear in a neurotic family from generation to generation. They are all interchangeable manifestations of an unstable nervous system. Hence, in an inquiry into the history of a case of epilepsy, it is not enough to seek for other examples of epilepsy, but we must look for all the above mentioned phases of a morbid heredity."

"Injury to the head occurring at birth, in childhood, or in later life, is, I am convinced, a not infrequent cause of epilepsy. Among other causes may be mentioned infectious diseases acting on the parents or on the patients themselves, frights or other emotional shocks either to the pregnant mother or the child, and a variety of obscure toxic conditions. Another reputed factor is what is known as a reflex cause; that is, convulsions brought about by irritation or peripheral nerves, such as dis-

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orders affecting the visceral nerves in the pelvis, the nerves of the gastro-intestinal tract, the nerves of the nose and of the ear, the nerves associated with the eye, etc. This so-called reflex type is undoubtedly the rarest form of epilepsy known. Among several thousand cases observed by Peterson, he found no case of epilepsy due to a reflex factor, although he had made it a point invariably to seek for such a cause. But I regret to say that there are certain surgeons who, through ignorance or dishonesty, profit greatly in their practice by pelvic operations, by operations upon the ear or nose, and by cutting the eye-muscles in cases of epilepsy, inveigling these sufferers into the hope of cure through such means. Yet no case of genuine epilepsy was ever cured by their method."

PATHOLOGY.—Although epilepsy has for a long time been considered as a nervous disease, and that its location was in the brain rather than in any of the peripheral nerves, yet no definite conclusion has heretofore been reached as to the part of the brain which is affected. Since the disease is characterized by such a variety of possible causes and by such a variety of symptoms and by such a difference in the extent to which the patient is permanently injured by the disease, the greatest perplexity has been experienced by physicians who have studied this disease from a clinical standpoint. Since, however, unconsciousness is considered as an indispensable symptom in this disease, and since the mental faculties are more or less impaired in chronic cases, it is evident that the organ which is the seat of the mind is also the part which is affected in epilepsy. The base of the brain, and perhaps the floor of the fourth ventricle, were for a time considered as the probable place to look for disease. But Gowers, Peterson, and other good authorities, agree in the opinion that "the seat of the disease is in the gray matter on the surface of the brain—the cortex. We have been able to limit its position in the organism to this extent. We understand these recurrent seizures to be a kind of explosion in the great nerve cells of the gray matter. It is not an organic disease, but what we call a functional disorder, aneurosis."

SYMPTOMS.—No two cases of epilepsy are alike. The same case varies from time to time, according to bodily conditions

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and as affected by environment. A severe epileptic fit has always been the recognized type of the disorder, and the symptoms observed in such a case are the ones which the text books usually describe. I will not undertake to go into details about hard fits. A few patients are conscious of some unusual symptom which tells them that an attack is impending, and yet the aura or the peculiar mental irritability or a tremor or a sudden jerking sensation in some muscle is of no practical value as a notice to the patient that he is about to have a spasm, so that by taking some remedy which is at hand, or by the judicious management of himself he can prevent the attack. A sudden abnormal mental state may constitute the first symptom and may leave a definite impression upon the memory. The brain processes which attend mental states may leave a residual effect which permits subsequent revival. That which precedes an epileptic fit may be called an emotion, or an idea. It is almost always some form of fear. There is no definite distinction between grand mal and petit mal. Spasm may occur and yet be unseen, a slight visible tonic spasm may easily raise a doubt into which class the attack should be placed.

In the popular nomenclature, various names are given to these attacks, according to their chief characteristic. The patient may say that he has had no fit at all; it was only a fainting spell. There is a disposition to underestimate the import of petit mal, namely, of the epileptic attacks which are not accompanied by spasmodic conditions and long periods of unconsciousness. Patients and friends often conceal the nature of these attacks, not realizing, perhaps, that they indicate a disease as serious and as difficult to cure as any other form of epilepsy. The forms of minor attacks are so various as to baffle classification and preclude full description. The typical attack is a momentary loss of consciousness, causing a momentary cessation of conversation; often a vacant look or the dropping of anything from the hand, and occasionally a fall. Of such loss of consciousness, a patient may be wholly unaware, so sudden is its onset and ending. He may go on with the sentence he was uttering, and be astonished to observe that those about him are looking at him with concern. Vertigo is a frequent momentary symptom of the

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minor attacks. It may be various in character, subjective or objective, but is of great importance on account of its frequency, and in that it is seldom associated with severer attacks in the same person. Indeed, this is true of all varieties of minor epilepsy, and makes it necessary to put leading questions to ascertain their occurrence.

After a severe attack of epilepsy, convulsive in character, the patient lies exhausted and prostrated, a deep sleep follows, and if the patient be prematurely aroused, there is likely to be a severe headache. In many cases there is little sleep but much headache. After an epileptic fit has been recovered from to a considerable extent, a peculiar state of automatic action may be observed in some cases. The simplest form is that in which a person goes on with some work in which he was engaged at the time and with every manifestation of consciousness, yet, after suddenly recovering himself, he cannot remember what has occurred. In this condition of mind, disorderly conduct may be indulged in, and the patient be controlled with difficulty. Under such circumstances, homicidal acts are committed by epileptics, who are most of the time possessed of their right mind and regarded by their acquaintances as competent to do business, and as wholly responsible for their conduct. This condition of brief insanity, the sequel of an attack of epilepsy, is pathologically related to another peculiar condition which may be termed hysteria. Such a state may last for a few minutes or a few hours. It may even be mistaken for the condition called "status epilepticus." The patient acts as though he were trying to break all records by having repeated and continuous fits, presumably for the entertainment of persons who are anxiously giving attention to the case.

The facts of epilepsy show it to be a self-perpetuating disease, and maintained and increased by a sort of habit developed in the brain. Thus the natural tendency is for attacks to become more frequent or more severe. Severe attacks occur at intervals which vary from a few days to a year or even more. In the majority of cases the interval is between a week and a month. In many patients the fits occur in groups, from two or three to ten or more may occur in a period of a few days, and then no

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more for weeks, or even months. Many sufferers from the disease are naturally weak minded, but persistent mental feebleness may be the result rather than the concomitant of the disease. The most important practical fact connected with mental feebleness is the frequency with which it is manifested when the attacks of epilepsy which have been going on for a long time cease altogether.

DIAGNOSIS.—The diagnosis in grand mal is easily made. The suddenness of the attack, the complete loss of consciousness, the tonic, followed by the clonic spasm, and relaxation of the sphincters, are pathognomonic. Hysterical people in their teens may simulate this disease, but such efforts are soon recognized. A knowledge of the quality of the urine and the condition of the kidneys is only necessary to enable the physician to diagnosticate the convulsions which are due to uraemic poisoning.

Epileptic fits are sometimes feigned by the inmates of workhouses and of jails, but there is usually an apparent motive for simulating this disease: the dilating pupils which are characteristic of epileptic fits are absent, also other symptoms which enable a physician who is at all familiar with epileptic seizures to recognize the difference.

Petit mal is to be differentiated from syncope and vertigo. Jacksonian epilepsy is usually symptomatic of gross brain disease which is revealed by other indications. The prognosis is unfavorable in congenital cases and in cases which have continued several years. Patients seldom die in or immediately after a convulsion, unless by accident, such as drowning, smothering in the pillow in bed while unconscious, choking with food which was in the mouth when the fit began.

PROGNOSIS.—It seems to be of small import from what form of the disease the afflicted individual suffers, whether it be petit, grand, or Jacksonian epilepsy; all, sooner or later, show deterioration of the intellect or the periodic occurrence of the graver forms of insanity. Nevertheless, it may be stated as a general rule that the earlier the disease shows itself the greater the liability to mental deterioration and the more rapid the decadence; while in those persons in whom the disease began in the later years of life, the deterioration process is much slower. The

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prognosis of epilepsy is a question of therapeutics. The recovery from the disease is freedom from fits without treatment, yet in no disease does treatment enter into the prognosis to the same extent or in the same degree. When every kind of attack is prevented, a patient is only on the road to a cure. As long as the slightest seizures occur, severe attacks would certainly occur were the patient to leave off taking the medicine which has arrested them.

The shorter the duration of the disease, and the less frequent the attacks, the brighter is the prospect of their permanent arrest. It must be remembered, however, that the less frequent the attacks the longer has treatment to be maintained before its influence can be seen, and therefore the more difficult is it to secure perseverance. The prognosis is better if attacks occur only in the night, than if they occur only in the day, or in both sleeping and waking states. It is better in idiopathic epilepsy than in the form which is the result of some old cerebral lesion.

The most unfavorable feature is the occurrence of minor attacks. These are often not influenced in the least by the treatment which stops the severe ones, indeed they may become more frequent. So long as they continue, if medicine is stopped severe attacks will soon recur. Hence the extreme importance of their recognition by the indications mentioned in the preceding section.

But treatment may produce a state which, however far short of a cure it may be, often involves a vast difference to the subject of the disease. The ability to work, the capacity to enjoy life may be regained, and as a consequence the relief of the friends from the pressing anxiety that is involved in the frequent occurrence of a fit. By treatment epilepsy is sometimes cured, but life is often transformed; and how precious this imperfect result frequently is can only be discerned by those who have witnessed the gratitude it evokes.

> 14. And when they were come to the multitude, there came to him a *certain* man, kneeling down to him, and saying,
>
> 15. Lord, have mercy on my son; for he is lunatic, and sore vexed: for ofttimes he falleth into the fire, and oft into the water.

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16. And I brought him to thy disciples, and they could not cure him.

17. Then Jesus answered and said, O faithless and perverse generation, how long shall I be with you? how long shall I suffer you? bring him hither to me.

18. And Jesus rebuked the devil: and he departed out of him: and the child was cured from that very hour.

19. Then came the disciples to Jesus apart, and said, Why could not we cast him out?

20. And Jesus said unto them, Because of your unbelief: for verily I say unto you, If ye have faith as a grain of mustard seed, ye shall say unto this mountain, Remove hence to yonder place; and it shall remove: and nothing shall be impossible unto you.

21. Howbeit this kind goeth not out but by prayer and fasting.

TREATMENT.—The tendency to the recurrence of convulsions, which constitutes the disease we call "epilepsy," can only be influenced by the administration of drugs; that is, by bringing certain chemical substances into artificial relation with the nerve elements concerned in the disease. Action is due to chemical union; instability to too ready union; stability is due to some unknown mode or restraint of the tendency on the part of the atoms of the nerve elements to unite with the oxygen brought to them in the plasma with which the structures are bathed. From this comes the molecules which they appropriate for the maintenance of their nutrition and of their capacity for action.

Mysterious as is the process, its control is not less so. The influence of the alkaline bromides, of potassium, sodium, and ammonium, is the most remarkable and definite therapeutical discovery of the last half century, and it was purely empirical. It is within the experience of every student, that if a person who is having a severe epileptic fit every week begins taking a drachm of bromide every day, he may not have a single fit for a year to come. Yet, during that time, there may have been no apparent perversion whatever of the normal action of the brain.

The three alkaline bromides present little difference in the influence they exert. Whichever bromide be employed, it must be given continuously; that is, the influence must be maintained

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without interruption. It is necessary to continue the regular administration of it for two years after the occurrence of the last attack of any kind, and then to spend another year in gradually diminishing the dose. Not until the end of the third year is it reasonably safe to omit the medicine altogether. This precaution applies to every method of treatment; there is no short method of cure. But the temptation to leave off the medicine is very great when the attacks have ceased; but it is then that the prospect of a cure makes persistence of the greatest importance. The duty of perseverance must be enforced upon the patient or his friends. Moreover, it is necessary to arrest all attacks, the slight as well as the severe; so long as minor attacks occur, it is practically certain that a severe attack will soon follow the discontinuance of the treatment.

The bromide may be given once, twice or three times a day, according to the frequency of the attacks. A single dose will generally suffice if the interval between them is one of several months; but if it be less than two months, two doses should be given. There is little difference in effect between two doses and three doses a day, provided the amount of bromide administered is the same. Two doses of 30 grains have generally the same effect as three doses of 20 grains. A single dose may be given either at bed-time or after breakfast, according as the attack occurs in the night or in the day.

The object is to arrest the attacks, and also to afford a margin of stability sufficient to resist an occasional exciting cause. On the other hand, it is important that the dose given regularly should not be larger than is necessary to achieve this object. In many cases that which is necessary and not excessive can only be ascertained by experience in the individual case. But the largest daily quantity which, as a rule, can be continuously borne with impunity is 90 grains, half a drachm three times a day; and for many, perhaps for most patients, this quantity is too large. The ordinary maximum may be put at 60 grains a day. Curable cases do not need more.

The system of increasing the dose when an attack is supposed to be impending is not to be commended. If such an increase be really necessary the constant dose is insufficient. Most

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persons can bear 60 grains of bromide daily for years without the slightest interference with the functions of the nervous system.

The only preventive of the bromide rash is arsenic, in the proportion of 5 minims of Fowler's solution to each scruple of bromide.

In general terms it must be said that, although various kinds of surgical operations have been made upon the arteries, on the sympathetic nerves, and on the skull for the relief of irritation or of pressure on the brain, the results of such work are not flattering. Trephining has seldom proved of permanent advantage, consequently the operation is not resorted to as much nowadays as it was years ago.

The diet of the epileptic should be plain and nutritious, but simple and easily digestible. A limited amount of meat may be taken for breakfast or for dinner, but not at supper time. Supper should be eaten a few hours before the patient retires. Food should be eaten slowly, and only a moderate amount taken at any one meal. The bowels should be thoroughly emptied daily. It is unwise to permit even one day to pass without an operation. A mild laxative can be used to insure this result.

The life of an epileptic should be as uniform as possible, regular meals, regular employment of a suitable character. The patient should not be permitted to overwork or be subjected to experiences which are exciting or irritating in their character. The education of children may go on without injury and even with advantage if all strain be excluded, and if it be remembered that the excitement of the play ground may be more harmful than the mental work of the school room. The realization by the patient that he has a disease which is difficult to cure is sufficiently depressing to his mind, therefore his attention should be occupied with employment which is natural and cheerful in character, so far as practicable.

At the meeting of this society in Burlington ten years ago, the following resolution was unanimously adopted: "That in our opinion it is desirable for the state to establish and maintain a hospital for the care and treatment of epileptics, consisting of a system of cottages for the accommodation of both sexes; for children as well as adults; for the sane as well as for the

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insane; for the cure of cases where complete and permanent restoration is possible; for the education of those susceptible of it; for furnishing occupation, amusement, and an isolated home for all sorts of persons afflicted with epilepsy."

At a meeting of the Muscatine Medical Society, held on the fourth of this month, action was also taken to attempt to secure from the next legislature an appropriation with which to establish and maintain an institution which shall have for its object the care and treatment of the Iowa people who are epileptics. The superintendent of the institution for feebleminded children and the several superintendents of the state hospitals in Iowa, have for many years, whenever opportunity presented, used their influence in favor of an institution in Iowa, supported by the state, for the exclusive care and treatment of epileptics.

Special provision has been made for epileptics in Ohio, New York, Massachusetts, Pennsylvania, New Jersey, Texas, and elsewhere in the United States. It is generally believed that a separate, well adapted institution affords the most comfort and happiness, the best chances for improvement and recovery, not to speak of educational privileges for the young, and suitable employment for all kinds of epileptics. Ohio was the first state in America to establish a hospital for epileptics supported by the state. In April, 1890, the legislature authorized the construction of a hospital for epileptics. It cost $40,000 and was occupied by 250 patients in 1893. Now there are more than a thousand patients in this institution. It will be noticed that in Ohio the provision seems to be made for epileptics who require custodial care and are much in need of medical treatment, many of whom no doubt, are insane.

The Craig colony for epileptics was instituted in New York in 1896, and has proved a grand success, but this institution, unlike the one in Ohio, is for epileptics who are not insane and who are not invalids to any considerable extent at the time of admission into the institution. It is estimated that fully 20% of the epileptics who are healthy and sane at the time of their admission into the institution, in the course of four or five years will require custodial care, which, of course, is much more expensive and burdensome than to provide for epileptics who are able to do some kind of work. The New York institution is

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located upon a large farm. Dr. Peterson, the president of the Board of Trustees of that institution, says: "There is but one kind of an institution which can meet the case of those who suffer with epilepsy. No asylum, no large hospital, no single vast building in a great city, is appropriate for the purpose. It must be an establishment combining many unusual features. It must have schools and teachers for the young epileptic. It must have offices, shops of all kinds, stores, dairy, farm, gardens, granaries, for, as they grow up, these patients should acquire trades or professions. It must have a group of small hospitals and asylum buildings, where such as are sick or mentally infirm may be cared for. It must have skilled physicians. It must have a church, amusement hall, gymnasium and bathing establishment. It must have, finally, a pathological laboratory, presided over by the keenest pathologist obtainable, so that, in the course of time, a cause and cure may be discovered for this terrible disease. Such a place would not be a hospital in the ordinary sense of the term. It would be a village in itself, a colony for epileptics."

Dr. Spratling, who is superintendent of this New York institution, says in a paper which he furnished to the Quarterly Conference of Iowa Superintendents, held in the rooms of the Board of Control four year ago, that the site for a colony for epileptics should be located on a large farm. It has been determined that the patients who work out of doors improve in far greater ratio than those who work indoors, and that agricultural work is the very best kind of employment which can be given to epileptics. The size of the tract of land to be secured should be large enough to provide, on an average, an acre for one person. This land will include all that is to be used, on which houses are to be put up, land for agricultural purposes, lawns, gardens, pasture, roads and walks. It is especially desirable that the tract furnish suitable sites for various buildings, located upon different parts of the farm, and that the land be as easily cultivated and as productive as possible. The epileptic should be able to produce by his own labor as much as possible of the food supplies he will require to consume, and when we remember that it is to his interest to eat largely of cereals, breadstuffs, fruit, milk, eggs, etc., we will understand the value of having

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good farm land to begin with. The land should be well watered, and accessible to the railroads. It is desirable to so locate an institution as to obtain fuel at a minimum price. The colony should be isolated from large cities, and so situated that the inmates of the institution may roam about in the neigborhood without getting into trouble or being regarded as nuisances. This institution for epileptics should be separate and distinct from any other institution for unfortunates.

It is my opinion that the Board of Control of state institutions in Iowa should recommend the next legislature to appropriate one hundred thousand dollars, to be available during the next two years for the purchase of 2,000 acres of land, all in one tract, located somewhere near the center of the state. On account of the cheapness of fuel, it would seem that either Boone or Mahaska county would be a most desirable place for the Iowa colony for epileptics.

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Discussion on the Paper of Dr. Hill.

DR. J. G. BILLER, of Cherokee.—*Mr. President:* I wish to say that I am very much pleased with the able manner in which this subject has been brought before the Society by the essayist. I consider it one of the most important subjects we have to deal with as general practitioners. We usually think that cases of epilepsy should be referred to the specialist or be neglected; but there is a large field where the general practitioner comes in before the specialist has anything to do with the case. Dr. Hill, in his paper, spoke about treating epilepsy in the early stage, and it is in this stage that the general practitioner should pay attention to it. It is not an unusual thing to have people tell you that this or that child is having peculiar spells. They speak of it as "spells." You may pay attention to these spells

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or you may not, but after a year or so, if you hold the family in confidence, the child is brought back to you, and you will find probably it is a well-marked case of epilepsy. It is in the early stages of epilepsy that the general practitioner should get in his work, and it is in those cases that I have had the satisfaction of believing I have done some good in epilepsy. Many of these cases are nothing more than some peripheral irritation; usually the stomach, the intestines, the kidneys, or some other organs are at fault, causing a local irritation, but this local irritation, while it may not amount to much, starts up a habit that is going to cause trouble. The child has gotten into the habit of having convulsions or unconscious spells, and this habit grows until the cortical cells have formed a habit and then we have a well-developed case of epilepsy. By paying attention to these cases early and getting at the cause of the trouble we may do good. I remember that one of the most humiliating cases I had for a number of years was a child who had epilepsy. The seizures were not very bad, but they gradually grew worse. I put him on good-sized doses of bromide of potash for a considerable time, without much benefit. This medicine was then stopped, and contrary to my advice they gave the boy a patent medicine; it relieved the irritation, and he made a good recovery. I try to get at the source of irritation in these cases. If it is the intestinal tract, I try to relieve the source of anything irritating that may be there, and I must say that in some cases the results have been surprising.

The usual method of treatment is about what Dr. Hill spoke of—the bromide treatment. Personally, I do not believe in the bromide treatment of epilepsy. I think it is irrational. I know that most of the authorities take the opposite view, but to me the bromide treatment of epilepsy is irrational. You have a nerve cell that is irritable; it is an immature or undeveloped cell to start with; it is not up to the normal standard. Its resistance is not what it should be. The slightest irritation will start an explosion, and unloads the nerve force that has been accumulating. Do you give bromide of potash to strengthen the cell? No, but you put it to sleep. You stupify it. I do not think you can strengthen anything by making it stupid. I have seen such disastrous results from the long continued use of bromide of

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potash that I shall not give it again for a long period of time to any epileptic. Where you have a case of epilepsy in which the patient is becoming exhausted and you want to give the nerve cells a rest, bromide salt answers well for a short period, but to continue it for two or three years, as the authorities recommend, is to me irrational and unjustifiable. I have never yet seen a case of epilepsy permanently cured by bromide salts. Of course, my experience has been limited as compared with other men in this line of work, still I have never yet seen a case permanently cured by bromide salt. The rational treatment to me is to give something to build up the nerve cell, to make it stronger, and capable of standing the abnormal irritation that it is unable to stand. We must build up the general physical condition of the patient. We must pay attention to the bowels, kidneys, and skin; also what food agrees with the patient. We cannot group epileptics as a great herd of people with one common disease, and treat them all the same. Every epileptic is a case by itself that needs weeks and months of care and watching before one can give it the rational treatment it should have. I have found nothing so good in building up these cases of epilepsy as the high frequency current. It assists in elimination. I have seen patients whose bowels refused to move, and yet by the use of the high frequency current I have brought about free movement of the bowels. Sometimes the kidneys do not act for hours or days. Sometimes the kidneys go for three or four days without acting at all; yet with the high frequency current I have seen cases in which the kidneys have been kept in good condition, in spite of epileptic convulsions, when they have always ceased acting before. The general nourishment of the body is important. The diet should be carefully watched, and I consider this a very important thing in cases of epilepsy. You must know what your patient is eating, and what diet is agreeable with him. You must remember that you are dealing with an individual who is separate from all other individuals. This diet may agree with that patient, and that diet may agree with the other patient. I know one case of epilepsy, a child, who will take oatmeal, but give it bread and milk and it will have convulsions at once, clearly showing how a slight difference in diet makes a difference with the patient.

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I consider it necessary for every practitioner, when a child is having any peculiar nervous phenomena, to pay careful attention to it, because the chances are he is getting hold of a case of epilepsy in its incipiency, when it can be cured quite easily. I do not wish to be understood as saying that all cases of epilepsy are curable, by any means, because we all know they are not; but even in the incurable cases, by great care and treatment, we may make life more bearable for them and for those who have to take care of them.

DR. E. H. MALLORY, of Linden.—We think of these subjects from our own standpoint. As I am connected with state institutions in which there are quite a number of epileptics, it occurred to me that I would like to say a few words in connection with this paper. I like to think of epilepsy as perhaps a symptom more than a disease. It is a symptom of a number of diseases, and not a disease itself. Another thing that I would like to think of in connection with epilepsy is the manifestation of total unconsciousness, and I always bear that in mind in considering the treatment.

In regard to the last speaker's remarks, relative to the curing of epilepsy, it is admitted by those who have had a good deal of experience with this condition, that it is one of the most intractable affections to deal with. We have no specific remedy for it; we cannot have it, because the condition is caused by so many diverse states. and so it is useless for us to look for that. The last speaker was correct in regard to building up the bodily functions, keeping the body in good health and strength and the organs of elimination acting as they should. That is one of the first principles in the treatment of epilepsy.

I desire to refer more particularly to the colony matter, because I believe this Society has adopted a resolution in connection with the establishment of an epileptic colony in the state of Iowa. I think the matter was brought before the Society first in 1893. I believe at that time there was a resolution passed favoring the establishment of such a colony. There are several epileptic colonies in the United States; the most prominent of these is the one in New York, commonly called the Craig colony. The next in prominence is the one to be established soon at Gallipolis, Ohio. In New Jersey they have established a state

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village for epileptics, having a large tract of land for that purpose. Other states are taking the matter up, and it would seem to those who advocate the colony idea, that open air exercise and work are factors in the treatment of epilepsy. The work should be of such a nature as to develop the physical system, not to occupy the mind to a great extent, and I presume you are all acquainted with the outlines of the Craig colony, so that it is useless for me to go into details. Their cures, if they have any cures, are largely due to rational treatment, building up the system, occupying the mind and body with some useful work.

I do not think I have anything more to say. I was pleased with the paper, and I regret the essayist did not have the opportunity to read it all to us.

DR. E. H. KING, of Muscatine.—There is no class of patients that should excite the profound sympathy of the practitioner of medicine like the epileptic. Every community has one or more epileptics, and every practitioner of any experience has got cases under his care. In many instances, they become socially ostracized; they are sent to insane asylums and are considered incurable. Their condition is deplorable. I hope the Committee on Medical Legislation will press this matter before the coming session of the legislature to have a colony established for epileptics, and that every practitioner will exert himself and influence the members of the legislature to vote for the establishment of such a colony.

DR. W. A. ROHLF, of Waverley.—I have enjoyed Dr. Hill's paper very much, and was interested in what he said regarding the use of bromide and how it could be withdrawn after a certain time. I recall two cases which were extreme in the matter of convulsions. They are now upon the bromide treatment. Both of them have gone on for two years having from eight to ten convulsions every twenty-four hours. But they have not had a convulsion now for over a year. I was delighted with what Dr. Hill said with reference to discontinuing the bromides and decreasing the dose. My experience has been contrary to that of Dr. Biller in regard to the use of the bromides. I recall one case particularly where I had a condition of almost complete apathy, so much so that we were seriously considering of sending the boy to the hospital at Independence on account of in-

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cipient insanity. This young man was put on the bromide treatment, and in a very short time he became brighter in mind, and after constant care and attention for a year or more and the continuous use of bromides, he was very greatly improved, so that now he is running a farm and taking care of his aged father. In this particular case the bromides did not put him to sleep.

DR. HILL (closing the discussion).—I stated in my paper that diet was as important as medication. I think the great discouragement with regard to the treatment of epilepsy is because the general health, as a rule, is not injured by the disease; consequently epileptics live a great many years, although they are not cured, and they take patent medicines. They go from one doctor to another; they are anxious to take treatment, and want to be cured, and therefore we see many epileptics who are incurable. We are not sufficiently careful in treating the first symptoms of epilepsy. Many of the incipient cases can be cured with care and timely treatment. Physicians can readily decide whether cases are curable or not when they are seen early. A person who is a mental imbecile from birth, or who has congenital epilepsy, or who has fits every month of his life, does not consult a physician until he has had them for a long time, or until the habit is established. Such cases, therefore, are not promising. As Dr. Biller said, the general practitioner and family physician should always give heed, when his attention is called by the mother to a child who is acting strangely, or grinding the teeth in the night, or who wets the bed, who has staring spells, momentary unconsciousness, or any symptom or complaint which is suspicious of beginning epilepsy.

It is true that when, ten years ago, this Society met in Burlington, resolutions were adopted urging the legislature to establish an institution for epileptics in Iowa. I think it is desirable that the next legislature shall make an appropriation for a large tract of land in Boone county or some other county, in the center of the state, where land is cheap, before it gets any higher, and secure such a tract of land for a colony of this kind.

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Section of State Medicine and Hygiene.

CHAIRMAN'S REPORT, F. W. POWERS, WATERLOO.

There are three classes of people who learn to value a physician's services; first, those who employ him in sickness; second, those who act upon his counsel in health; and third, the general public who look to him to safeguard public health from contagious and infectious diseases. The section on State Medicine purposes to dwell especially at this session upon the relation of the physician and state to the two latter classes, or rather the science of medicine as a conservator of individual and public health.

That the physician and state should severally and jointly meet the requirements and measure up to the duties of the hour, several things are demanded.

First—A closer co-operation and affinity between local and state boards of health, state and local health officers and the local profession.

Second—More painstaking investigation and studious application on matters pertaining to hygiene and sanitation, that the opinions given may be of greater value; based upon scientific research, personal or otherwise. instead of an empirical. dogmatic assertion, as it too often done.

Third—A systematic course of study upon sanitary science and physical culture for the public schools, and another also, for the laity through newspaper articles, magazines, pamphlets and lectures by those of local, state or national prominence.

Fourth—A more complete and thorough course in our several medical schools through didactic lectures, laboratory investigation and experimentation upon sanitary science, dietetics and hygiene. Such a full course could supplant the present short course in the length of the present college year without trespassing upon the time of other branches, or overtaxing the student. The physician of tomorrow would then not find himself handicapped, as we too often do, who took our lectures some years ago.

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Fifth—The establishment and permanent maintenance of a state laboratory for chemical and bacteriological examination and research, at the public expense, for the public good, for interrogating all communicable human and animal diseases and to furnish a working basis for the establishment and release of quarantine.

We flatter ourselves on the increased longevity as expressed in the late census, due, no doubt, more than anything else, to the correction of unsanitary and unhygienic conditions; yet we must not be neglectful of the great opportunities that still await us for the physical and moral betterment of the race of man, and aid in the development of a vigorous physique in the sons and daughters of our beloved state and great republic. All honor to surgical progressiveness; all honor to the advanced tread of medical application, pharmaceutical research and demonstrative physiological phenomenon; yet with all this advanced thought of the day and the benefits entailed, without national, state, and municipal control of infectious and contagious diseases, disposal of sewage and quarantine regulations, there would have been but a small reduction in the amount of suffering and but a slight increase in the physical, intellectual, moral, social and financial wellbeing.

TUBERCULAR SANATORIA.

Were all the preventable means used in every communicable disease and no "sins of omission or commission," there should be but one case, save those who received the infection from the same source and about the same time as the initial case. How far are we from this coveted goal? An important advance towards this position was taken by the United States congress last winter when it changed the Marine Hospital Service to the Public Health and Marine Hospital Service, which among other important matters requires an annual conference of state, territorial and national authorities, and providing also for such extra meetings as are deemed wise. By this annual intermingling, association and constant touch and communication of national, state and territorial executive, health and sanitary authorities, coupled with such other meetings as the state and provincial Boards of Health of North America, the American Public Health association, the American Medical association, the Pan-American

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Sanitary conference, the International Congress of Tuberculosis, the state, district, county and city medical societies, it would seem that much good would be accomplished. There still is lacking the detail of application and attention of the physician to the individual case, as the teaching is too general and the application not sufficiently explicit for the control of the chronic infectious diseases in the ordinary home. This is especially true in the handling of our tubercular cases, and since we are wards of the state and entitled to protection it would seem that the only perfect way of giving the individual case the attention of modern thought, and at the same time protect the general health, would be through a well equipped sanatoria.

The report of Surgeon P. M. Carington, in charge of the sanitarium in New Mexico which was inaugurated by the U. S. Public Health and Marine Hospital Service, proves beyond a doubt the benefits that may accrue from this manner of handling tubercular cases. The report says: (1) Given a sufficient length of stay, recovery may be expected in a very large per cent. of first stage uncomplicated cases. (2) Recovery or arrest may be expected in a fair proportion of second and third stage cases, and all febrile cases in which there remains sufficient sound lung tissue to support life, but we should exercise caution lest we be premature in pronouncing second and third stage cases cured. (3) Results in persistent febrile cases, especially those in which there is a wide range of daily temperature, are no better than in less favorable climates. (4) Hemorrhages seem less liable at this altitude than at the sea level. (5) Heredity plays an unimportant part in the causation of the disease.

In the light of this report and many others equally as favorable, our legislature should be importuned for a liberal appropriation for such a project. Who can say that the end does not justify the financial expenditure, our present high taxes to the contrary notwithstanding? For individual good and care the home for epileptics is of almost equal importance, as demonstrated by the Craig colony in New York; but as a public measure, for the public good, sanatoria for tuberculosis it occurs to me is of greater moment. Our public schools are a blessing and a curse; a curse for lack of systematic medical inspection, advisory to the corps of teachers and school board, without

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which so many contagious diseases are constantly being transmitted from pupil to pupil or teacher, or vice versa. Ignorance of the parents and teachers of the physical condition of the children, which would be determined by the investigating officer, prevents many a child from having a natural development, suffering it may be from eye strain, adenoids, superheated and illy ventilated rooms, poor seats and non-fitting desks, too much mental and too little physical training, at the most critical time of development, too much home study and too little home play, too many hours at work and too few at play, too much musical and social requirements outside of school, for which latter evil parents are much to blame and in a great way responsible.

SEWAGE.

The small size of our streams and the rapid increase of our population brings the disposal of sewage to a prominent place demanding an early solution. Natural drainage other than that which is poured into the streams from our larger cities renders the water at certain seasons wholly unfit for drinking purposes. When to this is added the pollution from the sewage of our cities, the streams it would seem could be hardly fit for the habitation of the ordinary fish. The use of the septic tank, as demonstrated from repeated and frequent examinations of the affluent and effluent, has furnished a practical solution of this vexing question. Should this meet our most sanguine expectations a law should be enacted furnishing greater protection to our streams and requiring every municipality and state institution to be thus equipped, and that all sewage should be thus thoroughly purified before being dumped into the streams.

MEDICAL RECIPROCITY.

That there is a constantly increasing interest and necessity for a change in our Medical Practice Act permitting of an exchange of reciprocal relations of registration of licenses, we believe to be true. Slow but progressive medicine has prompted this exchange of licensures. Many and varied have been the plans and individual opinions upon which it would be a safe basis to work. To solve this vexing problem there has been organized the National Confederation of Medical Examining and Licensing

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Boards, the Confederation of New England State Medical Boards, and the American Medical association also has a committee on National Legislation which has devoted much time in its endeavor to evolve suitable and satisfactory plans for the several boards which could act within the scope of the several States Practice Act and also conserve the best interest of the health of their citizenship.

Dr. W. L. Rodman, of Philadelphia, suggested the formation of a voluntary national examining board. This met with the support of the journal of the American Medical association, but was not approved by the National Conference for the following reasons:

1. A voluntary national examining board would have no power, authority or legal right to exist.

2. No guarantee could be given of the continuance or permanency of such voluntary board, even with the laws of the several states so modified as to meet its requirements.

3. Being a voluntary board, there could be no legal manner of constituting, changing or limiting its membership or defining its duties.

4. Such a board would be representative of the profession only and of the regular profession alone.

5. Without the endorsement of a state board authorized by law to grant a license to practice, a certificate of qualification from the proposed voluntary board could have no legal value whatever, and under the existing laws of the several states the state examining boards are required to conduct the examinations and such boards cannot evade nor surrender such duty even if they desire so to do.

6. To attempt the stupendous task of securing the passage of amendments to the existing laws regulating the practice of medicine in the several states would entail an enormous labor and expense and would probably endanger the laws themselves.

From the argument of the opposition it would seem that this voluntary board is beyond the pale of possibilities. The states that at present provide in their acts for a more or less full exchange of licensures are: California, Deleware, District of Columbia, Illinois, Indiana, Kansas, Maine, Virginia, Texas,

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Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Wisconsin, Puerto Rico.

You will notice that Iowa is not in the list. Your State Board of Medical Examiners has sent delegates to two reciprocity meetings the past year for a conference to determine the most feasible plan. Our laws should be so modified that reciprocity could be consummated at the discretion of the board with such states as will reciprocate upon reasonable terms and whose minimum requirements are equal to those of our state, and who recognize as in good standing such medical schools as are approved by the reciprocating boards. Some states adopt seemingly very ridiculous and arbitrary standard, for example, Ohio, which among other requirements recognizes as applicants for examination graduates of schools located only in cities of 50,000 population or more. Others have required a teacher's certificate before having commenced the study of medicine, or the applicant is required to provide himself one after his graduation and prior to examination.

CRITICISM OF PRESENT EXAMINATION.

The present plan of the examination of our State Board of Medical Examiners, to my mind, is manifestly unfair to the old practitioner, since the law requires an examination which is in fact fitted for the recent graduate whose mind is full with so many abstract thoughts and scientific learning and which at times has but little contained therein for practical application, which we all know is the final test of medical and surgical skill. We are then in a measure prohibiting the ingress of the very class of experienced physicians which we should encourage to come. Reciprocity it would seem is about the only corrective measure applicable and this must vouchsafe protection to those graduates of schools which formerly required but two or three years course of study, as well as protect the future by providing an examination of higher elementary scientific standards for those graduates of recent date, as the profession and laity are desirous of raising the standard of scientific and medical attainments and practical application in the practice of medicine and surgery.

Again, recognition should be given the recent graduate for his achievement in school, for the number of hours spent in cer-

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tain branches and the laboratory and hospital training as well as in didactic lectures, instead of so many years in the general study of medicine, in which time certain schools with an aggressive and learned faculty, and well equipped with laboratory and other facilities, may give thirty per cent. more instruction during the same number of years than another.

A PLEA FOR BETTER SCHOOLS.

Again, what excuse is there for so many medical schools and the different schools of practice. About a year ago we contributed a short article for our state journal bearing on this point and we desire now to emphasize the thought then expressed, that it would be much better to be broad minded and adopt the good of all schools and cease this envious strife and school loyalty and turn our guns against the common enemy—the charlatan, quack and faith cures—and by so doing command and be worthy of greater respect and the esteem of the people, instead of a smile of criticism. Then and not until then can we command the influence in legislative halls that is justly ours. Why could we not have a great medical university, where would be taught the elementary and fundamental branches to all students alike, including also surgery, obstetrics and gynaecology, and then have separate chairs for the instruction in regular, homeopathic and eclectic practice? The expense would be less and the large number of students in attendance would furnish funds for securing the leading lights in the constellation of the several schools of practice, and at the same time this arrangement would amalgamate the entire profession, and with such a unity of thought and purpose the influence would be a power wherever it existed.

I know this will meet with the opposition of a large number of our honored and distinguished membership and some may be constrained to call me a heretic and an iconoclast. With this thought, however, I believe you will all agree that it is food for earnest consideration. I only regret that being a chairman's report places the subject matter beyond your discussion, and I might add that I am also pleased that the society is in no way responsible for any expression of mine.

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MEDICAL COMMERCIALISM AND TACT.

There was a time when the medical formula was everything, now the medicinal remedial agent plays but a very small part in the treatment of our internal medicine cases, to say nothing about the large class of the other sort. Moreover, should not our students be taught commercial as well as scientific attainments in the handling of cases that he may give gratuitous service to those who are worthy and not otherwise, as by so doing great benefit will accrue to him as well as inure to the financial betterment of all. Now do not misunderstand me. He that makes commercialism his first thought has fallen far below the intent of his creator when he caused the first impression to quicken his mind to prepare himself to assuage the pain and disease of another. He also has fallen below the highest and best ideal of our noble profession when he loses sight of everything but "to get business at any cost" and to keep his colleague from getting any even to the extent of cutting fees, discounting bills honorably earned, where value in full is given in exchange. A happy medium fully recognizing the professional, moral and financial obligations concerned should all be taken into consideration. And in the handling of all cases I know of no better rule than, first, the good of the patient; second, our professional reputation in the case, and third, the money. They should come in the relation as read, each overshadowing the other, each being subordinate one to the other, and a thoughtful consideration given to the whole.

GENERAL SUBJECTS.

I would like to say something about pure food laws and a subsidized press. Also the importance of having our vaccine and antitoxin serums under federal control, and the good that might be gained from the study of mortuary statistics, if we had anything reliable or complete, which brings us to the point of urging better laws for the preservation and collection of all vital statistics, and with this suggestion I must close.

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STATE BACTERIOLOGICAL EXAMINATIONS AS A DIAGNOSTIC AID FOR THE CONTROL OF INFECTIOUS DISEASES.

WALTER L. BIERRING, M. D., IOWA CITY, IOWA.

In the progress that medicine has made during the past two decades, the influence of the laboratory worker is recognized at every turn, and the results of laboratory research are impressed upon the study of nearly every form of disease process peculiar to the animal organism.

In no field, though, has this influence been so prominent as in the application of bacteriologic methods to the study of the infectious diseases.

As compared with the hazy, imperfect, and fanciful ideas which prevailed formerly, our present knowledge is no less than phenomenal. There could, indeed, be no better or more eloquent testimony to the profundity of the change brought into medical study by bacteriology and allied sciences than is furnished by the data now at our command in connection with infectious diseases.

The discovery of the cause and mode of spread of contagion and infection has made possible accurate and conducive investigation of the problems of infectious processes.

Sanitary science and the questions of public health have received a new meaning and significance. The data which have been collected in reference to the nature of infectious causes, their manifestations. and modes of dissemination, have been of greatest value in the recognition, prevention, and possibly the therapy of infectious diseases.

Asiatic cholera has knocked at our doors and been effectively confined to the harbors of entry. Although a most unwelcome guest, the plague has gained admittance into our country, but its area has been kept greatly restricted.

The modern methods introduced for the control of tuberculosis, directed specially towards the destruction and prevention of the spread of tubercle bacilli, have done more to check

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the progress of the great white plague than any of the various therapeutic means that have been devised.

The study of the diphtheria bacillus revealed the true nature of the infection, and in the experimental work and production of immunity with the formation of antitoxin, diphtheria has been robbed of its terrors.

With the demonstration of the causative agent, definite criteria have been established for the diagnosis of the different diseases, of which the following may be cited as examples: The presence of the tubercle bacillus in an affected tissue or organ is the only reliable test of tuberculosis; where anatomic changes are often confusing, the demonstration of the bacillus is always positive criterion.

The Klebs-Loeffler bacillus is the established etiologic agent in diphtheria and its presence is significant of a diphtheritic infection, no matter what the degree of the inflammation may be. Our conception of a tyhpoid infection has undergone a sort of evolution with the development of bacteriologic knowledge; at first regarded as a local process involving the peyerian patches of the ileum, subsequently considered as a toxaemia from the absorption of poisons generated in the intestinal lesions, then with the demonstration of typhoid bacilli in the circulation, rose spots, urine, glands and joints, frequently without the appearance of any intestinal lesions; typhoid fever has become established as a bacteriaemia, and now the demonstration of the typhoid bacillus is regarded as the only true guide in forming a diagnosis.

Equally true is this in connection with the recognition of the bubonic pest, Asiatic cholera, glanders, anthrax, and a number of other diseases.

As these various data have become definitely established, it is but natural that they should be incorporated in the diagnostic armament of the practicing physician, and the staining of tubercle bacilli in sputum, detection of pyogenic organisms and gonococci in purulent secretions, prevails as freely as making the ordinary chemical analysis of urine.

It must be generally evident that in order to utilize all the fruits of bacteriologic investigation in general diagnosis, the practitioner recognizes his limit in certain directions in that

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there is a lack of that laboratory equipment required to pursue all the necessary tests.

In illustration of these points I would state that the diagnosis of diphtheria depends on the making of serum cultures, and to test the further virulence of the organism concerned an animal inoculation is necessary. By means of the diagnosis sets now furnished by various pharmaceutical houses, the inoculation and first study of the method is readily carried out by the physician, but the proper determination of the results is not always possible away from a general laboratory.

The detection of typhoid bacilli in the various lesions and discharges requires an extensive outfit of culture media and the making of numerous tube and plate cultures which can only be carried out in a fully equipped laboratory. The Widal serum test now has its definite place in the diagnosis of typhoid fever, in fact it is specific and of special import in the differentiation from para-typhoid, para-colon, and other febrile affections of similar nature. In this test great care is necessary in making the dilutions of the blood specimen, the typhoid culture used must be of a definite age and character, a certain caution is required in properly interpreting the agglutination, which can come only with frequent observation and experience, so that this method is strictly a laboratory test without questions.

In all bacteriologic examinations of water, whether quantitative or qualitative, the need of a laboratory equipment is very evident. This applies also to examinations in connection with diseases of lower animals, being particularly true of hydrophobia, where the indeterminate nature of the virus, the lack of any definite anatomic lesions, makes the animal inoculation test with nervous material from a rabies animal the only reliable means of recognizing the disease.

When I advocate the establishment of a bacteriological laboratory in connection with the Iowa State Board of Health, I recognize that the same rights are due to the state as to the individual, and if a complete laboratory seems frequently necessary to the physician in the control of infectious cases, certainly it is equally essential to that institution into whose charge we place the control of the infectious diseases of our state.

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No infectious hospital or institute for infectious diseases can possibly exist or hope to carry on its work without a well equipped laboratory.

With the welfare of our people at stake the State Board of Health should have the benefit and aid of all those scientific measures which investigation has developed to be of value, especially since it must often-times put its authoritative seal where the interests of an entire community are involved.

I congratulate the Society on the opportunity of hearing what the experience of a well established laboratory has been in the state of Minnesota, by men who are pioneers of this movement in the West. It has been my privilege to become acquainted with the work of this laboratory in our sister state, and I know that I am free from the visionary when I entertain the possibilities of such a laboratory in our own state.

The Iowa board could not do better than to take its model from Minnesota and with a director, proper assistance, and good laboratory equipment, it should in time do equally as efficient and beneficial work.

From this laboratory, diagnosis sets such as are used in diphtheria could be sent out, and returned for examination; the necessary means for obtaining material for the Widal serum test provided; furthermore, all examinations of tuberculosis, and all experimental work in connection with infectious diseases occurring in man and the lower animal would come within its sphere. It would place the real work of the board on a scientific basis, and the systematic correlation of data must certainly prove of great benefit in the subsequent control of infectious diseases.

It is too much to hope for the annihilation of the typhoid germ, diphtheria bacillus, or any of the pathogenic microorganisms; there is no reason for believing that any germ one started on a course of invasion has been destroyed. Limitation, not annihilation, is the result to be aimed at and achieved.

The possibilities for new discovery from this proposed laboratory are many; scarlet fever, whooping cough, measles, smallpox, are still examples of distinctly bacteriologic diseases, in which the causative agent has not yet been determined.

The opportunities of such a laboratory will be much better for the study of infectious diseases than many a private labora-

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tory, because it will be in intimate touch with every outbreak of disease throughout the state.

It is possible that in time its sphere will include the examination of biologic products, such as are used for therapeutic purposes, and thus afford that state control of the different vaccines and sera which has proven so efficient in the countries of the old world.

This laboratory in all its privileges should be open to every physician in the state, and the results of its work should at all times be utilized for promoting the sanitary interests of every citizen. Its purpose must appeal to this Society and it certainly deserves the warmest endorsement so that it can be established by the legislature during the coming winter.

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THE LABORATORY IN PUBLIC HEALTH WORK.

F. F. WESBROOK, MINNEAPOLIS, MINN.

I wish first of all to express my appreciation of the honor done to Minnesota and to me by your invitation to present before this Society some of the phases of laboratory work in relation to the public health.

There seems to be little need to urge the desirability of the establishment, equipment and proper maintenance of laboratories for the study of the cause and as an aid in the prevention of transmissible diseases of men and animals. Many of the state and provincial boards of health of the United States and Canada, as also in Mexico, have had laboratories in operation for a number of years. It is quite compatible with modesty to assert that America, the eminently practical, is not behind the older countries in the application of scientific methods to the location and elimination of dangers to the public health. Of necessity, owing to geographical, climatic, financial and other conditions, such as relative density of population and the laws under which the state boards of health are constituted, the state laboratory work undertaken throughout America varies within rather wide limits, and it would appear proper to consider shortly the scope of the laboratory work of a state board of health.

SCOPE OF STATE BOARD OF HEALTH LABORATORIES.

The establishment by many large cities of laboratories in connection with their municipal boards of health has made provision for a large amount of investigation, but there still remains a much larger field which must fall primarily to the state boards of health at least for many years.

In some of the larger states where the distances are great, the difficulties of operation are increased but are not insuperable. In general, the work of a state board of health laboratory may be subdivided into two classes.

First—Routine work whose aim should be to assist, when necessary, local health boards throughout the state in the exact determination of foci of known infectious diseases, and thus

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attempt to prevent the spread of such diseases. This should include not only the examination of materials from human beings, but suspected water, milk, food and even domestic and other animals where the infection may be spread from them to man. The testing of new methods of bacteriological diagnosis; of the values of various commercial antitoxins and disinfectants; together with the investigation of other problems for which methods have been formulated, should constitute a part of the routine work of such laboratories.

Second—Research work should be undertaken so that the etiology of obscure infectious diseases and their methods of transmission may be determined, new methods formulated and old ones adapted for the conditions which obtain in the particular locality; whilst in general, all problems concerning which exact knowledge may benefit the state and protect its health should be studied.

It is impossible in all cases to draw any sharp line of demarcation between what constitutes routine work and what may properly be considered research.

Routine work should be done only by highly trained men. Methods should be most exact. Careful records of the methods employed and the results obtained be faithfully preserved. In this way what appears at first to be simply dull routine may often be found to yield new scientific facts of the utmost value not only to the particular locality but to the world in general.

So far as can possibly be done, individual members of a state board of health laboratory staff should be assigned definite pieces of work for a given period of time. It frequently happens that problems of doubtful value are thrust upon state institutions. Opportunities for investigation must, of course, be seized at the time when they present themselves, and it is necessary to guard against the interruption of any particular piece of work which has been begun and which promises well. This requires careful adjustment of the work to the workers and the possession of some reserve force and reserve funds.

The position of a laboratory worker seems ill-defined. Up to the present time he has not been fully admitted as a consultant in medicine, although his training along all lines should have

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been equivalent to that of the general practitioner in addition to his special knowledge pertaining to laboratory methods and the interpretation of results obtained.

The installation of state laboratories should be made along very definite lines so that the position of this branch of scientific medicine be not jeopardized.

Examinations of tissues, tumors, pus, sputum, urine and other materials which are of direct benefit *only* to the medical man in the prognosis and treatment of disease, should not be conducted at the expense of the state. They constitute a part of the work of a consultant. State boards of health should only make investigations which are of especial use in the location and control of disease. Therefore, only in the case of infectious diseases over which the state board of health has control or in the investigation of the unknown cause of disease, should examinations be done by them. It is unfortunate that some state boards of health have established laboratories in which diagnostic examinations of all descriptions are made. This means that by the unnecessary assumption of the cost of such examinations the state renders it impossible for private consultants in this legitimate line of medicine to earn a livelihood and thus discourages a branch of scientific medicine.

The consideration of the exact scope of a laboratory in any given state depends so much upon local conditions that it would appear best to consider briefly some of the specific branches of work which have been undertaken by laboratories already established.

Certain state boards of health undertake the manufacture of various antitoxins which are supplied gratuitously to local health officers for use throughout their state. Amongst the states in which this is done may be mentioned Massachusetts and New York. Experience has shown that reliable antitoxins may be supplied at a very much lower cost than those obtained from commercial houses. This is a matter, however, for each state to decide for itself. As a business proposition where free antitoxins are supplied by the state, it would appear to be a good one, although the question of whether all antitoxins in the country should not be inspected, standardized and passed or

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condemned, as the case might be, by a central government bureau, is a matter for consideration.

The establishment of institutions for the protection and cure of human beings who have been bitten by rabid animals, and provision for their maintenance, should be considered by state boards of health. By a mutual arrangement with some educational institution, such as a large university or hospital, this may be found feasible, although "a priori" it would appear that the state boards of health should have oversight over such institutions and they might well be established in connection with board of health laboratories.

The duties of health officers are such as to require very special training in matters pertaining to their legal responsibilities, the machinery of quarantine, inspection of water, milk, meat and other foods, and in these and other lines of activity some knowledge of laboratory methods is imperative. The necessity for the provision of special courses of instruction is becoming daily more apparent and the state boards of health should be the prime movers in this direction. By collaboration with universities or by other means, state boards of health must be prepared to institute or cause to be instituted under their supervision, special schools of instruction for those who are to become health officers. It is not too much to expect that in a short time some special diploma, as indicating the possession of special qualifications for such a post as that of health officer, may be demanded. State board of health laboratories, particularly if connected with state universities, should establish special courses, then, for teaching prospective health officers enough of laboratory technique to ensure successful collaboration of the state and local officers.

ESTABLISHMENT AND LOCATION OF LABORATORIES.

Nearly all public health laboratories already established in America are either connected with universities or have at their heads men with university affiliations.

These include the laboratories of Massachusetts, Minnesota, Vermont, New York state, Quebec, Ontario, Manitoba, as representing state and provincial boards of health, and New York

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city, Philadelphia and Chicago as representative of municipal laboratories.

In states provided with state universities, it would appear to be economical and in every way satisfactory to establish a relationship between the medical laboratories of the two state institutions, i. e., the university and state board of health.

In Minnesota, where there is an efficient state university and an active and progressive state board of health, the importance of maintaining this relationship established some years ago, is evidenced by the fact that the omnibus appropriation bill of the legislature at present in session makes provision for a building to be erected on the university campus, of which one-third is to be used for State Board of Health laboratory purposes and two-thirds for the Department of Pathology and Bacteriology of the Medical Department of the university. The cost of this building is estimated at $100,000, and for the equipment required by these two laboratory departments, in addition to that already available in the present laboratories, $25,000 was requested, although only a part of this latter sum has been provided for in the bill. The balance will be made available, it is expected, by the next legislature.

Two distinct staffs are provided for these two phases of work by the state and their salaries and the equipment and running expenses come from two separate funds, one under the control of the State Board of Health and one under the Medical Department of the university. The State Board of Health has had $10,000 per annum for the maintenance of its laboratory for the past two years, although this has been found quite insufficient. The board has already erected and equipped on the university campus a Laboratory of Animal Research.

The following reasons for the continuance of the present arrangement in Minnesota have been very apparent:

1. For the university there is available through the State Board of Health much valuable material for the teaching of bacteriology and sanitary science which could not be obtained in any other way.

2. University students have an opporunity of seeing the actual laboratory work done for health officers throughout this

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state and of learning more of the practical duties of health officers than would be possible in any other way. Their proper instruction in matters of public health is of very decided benefit to the state at large on account of their influence as they go out into different portions of the state, and is particularly apparent when they become, as many of them do, health officers for the localities into which they go. Animal tissues examined in the veterinary work of the State Board of Health are found very useful in the university laboratories for demonstrating to medical students the relationship and similarity between diseases of men and animals.

3. The opportunities for research work along the lines of preventive medicine which are brought to light during the operations of the State Board of Health are very numerous, and this board has shown itself fully alive to its opportunities and fostered in every way possible the work of investigation along a number of lines. The influence of this work upon the university and upon the students who are taking the work in pathology, bacteriology and hygiene is of the best.

4. There is a mutual stimulation to the workers in the laboratories of the university and State Board of Health in their present close association. The teachers and researchers in the university have much the same kind of problems confronting them as have to be met and elucidated in the State Board of Health laboratories.

5. As an illustration of economy, in the matter of books it has been found possible through these two department to acquire for the use of the state the nucleus of a good working library. Works of reference pertaining to bacteriology and hygiene are to be found largely in the laboratory library of the State Board of Health, whilst those dealing with pathology and experimental medicine are to be found in the library of the Department of Pathology and Bacteriology. It is true, too, that where a method is evolved in the one laboratory it is very quickly applied and utilized in the other, and many other illustrations of the utility of this association might be given.

The laboratories of state boards of health should be easily accessible from all parts of the state so that specimens can be

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forwarded without unnecessary delay, although not all investigations, by any means, can be brought to a satisfactory conclusion where materials are forwarded to the laboratory. There is a very general misapprehension in this regard, probably due to the fact that specimens, such as those from throats of diphtheria patients, blood for Widal's test and portions of the spinal cord or brain of supposedly rabid animals, may be forwarded considerable distances for examination and upon such examination reports of very great practical value may be given.

Many problems, such as investigations of water supplies, and milk, and all unknown or new diseases of men and animals, require the presence of the laboratory man in the field where he can begin the necessary investigation with the materials before they have been disturbed and before putrefaction and other processes have begun. All available data must be collected and at times it seems as if the only way this *can* be procured satisfactorily is by the laboratory man himself. The importance of these two matters, i. e., the actual presence of the laboratory man at the original site of the inquiry and the acquirement of data essential for the proper interpretation of laboratory findings must never be lost sight of and proper provision must be made for them.

It is no unusual occurrence in laboratories to receive tissues or fluids in all stages of decomposition and unaccompanied by any data whatever, sometimes even the name of the sender being omitted. Still the senders of such "miscellaneity" sometimes expect to be told the complete etiology, pathology, prognosis and treatment of the condition.

Many amusing instances could be cited which would tend to show the omniscience with which some people credit the laboratory man. Whilst this may be initially flattering it is unsatisfactory and must in most instances lead to disappointment and even unjust criticism of men and methods.

Being necessarily more familiar with the work done in Minnesota, I shall, as has been requested, consider some of the problems which have had to be met in that state and to comment shortly upon similar work by other state and provincial boards of health, in order that a somewhat general view of what is being

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undertaken and accomplished throughout America may be presented.

DIPHTHERIA.

The examination of specimens derived from the throats or noses of suspected diphtheria patients has been undertaken by many boards of health, particularly city boards of health, for many years. New York City, Philadelphia and Boston have set an example to the rest of the world of which they may well be proud.

Minnesota was, I believe, the first to establish a state board of health laboratory and to undertake examinations for health officers and physicians of the state at large. The work begun in October, 1894, was further systematized by the permanent official establishment of the laboratory in January, 1896. The local health officers throughout the state are provided with the necessary materials for forwarding serum cultures, inoculated at the bedside, to the laboratory in Minneapolis, where specimens are examined and reports forwarded by telegraph or mail within eighteen to twenty-four hours after the receipt of the specimens. Quarantine is largely regulated on the laboratory findings, and when two successive negative cultures have demonstrated the absence of diphtheria bacilli in cultures from the patient, he is released from quarantine after proper precautions have been taken in the matter of disinfection.

In Minnesota during the last two years nearly 8,000 diphtheria examinations were made, and reports which served as a basis for the regulation of the quarantine forwarded to different parts of the state by mail, telegraph and telephone.

By careful record of laboratory findings and the co-relation of clinical observation, when possible, with types of diphtheria bacilli present, etc., much interest has been added to this work, and a classification of the types of diphtheria bacilli formulated which has been employed in collaboration with other laboratories throughout America in the investigation undertaken by the Massachusetts Association of Boards of Health. This association reported upon the distribution of diphtheria bacilli in the

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throats and noses of the apparently healthy and the work is familiar to all.*

During the course of the routine investigations, the length of time during which B. diphtheriae persists in the throats of clinical cases has been studied and for the state of Minnesota it has been demonstrated that quarantine regulated by laboratory findings rarely exceed three to four weeks, twenty per cent. of the patients being released in less than two weeks from the beginning of symptoms.**

In the light of such results obtained in Minnesota, as they had been elsewhere, one might reasonably expect the laboratory regulation of quarantine to be unanimously adopted, although as yet local health boards are given an option of four weeks quarantine where the laboratory is not utilized.

Other matters of very great interest and importance have arisen in connection with these examinations, such as infection with diphtheria and diphtheria-like bacilli in public institutions where children or adults are housed together in large numbers. In one of these investigations—that at the State Public School for Dependent and Neglected Children, at Owatonna, Minn.—attempt was made to eradicate diphtheria bacillus from the respiratory passages of those in whom it was found, it having been ascertained that there was very widespread infection with this micro-organism. Individual isolation was tried, together with local treatment and general precautions, but it was found impossible to permanently eradicate the bacillus even though freedom of the throats and noses from B. diphtheriae had been demonstrated by three successive negative examinations. Upon allowing these children to mix together again, the bacilli were soon found almost as widespread as before. It would seem, therefore, that in state institutions the study and treatment of diphtheria constitutes a problem by itself. Similar conditions have since been found in other states.

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*—Journal of the Massachusetts Association of Boards of Health, July, 1902, (Proceedings of the April Quarterly Meeting).

**—Page 513, Minnesota State Board of Health Report, 1899-1900.

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In one town, containing over 300 day school children, where diphtheria had been widespread during the preceding winter and persisted during the summer vacation, by exclusion of all children who showed the typical forms of diphtheria bacillus from attendance at school until they were shown to be free from them, the disease was wiped out. Officers of the State Board of Health made a local inspection and it is needless to say that during the examinations mentioned there came to light many conditions which had not been known to exist. Attention to these with laboratory guidance stamped out the disease and school opened at the regular time.

A study is at present in progress to determine the influence of large doses of antitoxin upon the types of bacilli present in clinical cases of diphtheria.

Many other problems and interesting incidents have occurred, such as the regulation of quarantine in large hotels which were infected. The accuracy of the method was well shown in one instance in which material was obtained from the respiratory passages of a body which had been buried for some days. The cause of death was given as "acute laryngitis," and the body shipped to another locality in the state. The casket had been opened and a public funeral held. The coroner exhumed the body and from the fluids escaping from the nose and in material from the trachea, typical bacillus diphtheriae was demonstrated in almost pure culture by the laboratory.

In nearly every state and province in America diagnostic work is done either by provision of state or provincial laboratories or by arrangement with certain municipal or college laboratories. Amongst the state laboratories in which this work is very well systematized may be mentioned Maryland, Massachusetts, Minnesota, New York, Rhode Island, Vermont, Manitoba, Ontario and Quebec, whilst all the large cities are provided with facilities for carrying on the work.

TYPHOID FEVER.

Since the application of the method of the late Wyatt Johnston (Montreal) for utilizing dried blood for the determination of the presence or absence of the Widal reaction, it has been

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found possible for state laboratories to undertake this work for physicians and health officers.

Owing to the occurrence of an epidemic in Minneapolis in 1897, the Minnesota State Board of Health was placed in a position to be amongst the first in the wide application of this method. A method of quantitative determination was elaborated which very greatly increased the reliability of the test. To the end of 1902, 6,896 examinations have been made and reports furnished.

In certain laboratories, particularly that in New York City, examinations of urine and faeces for the presence of B. typhosus are made. These have not been found practicable, however, in many localities, as the value of the examinations does not seem to be commensurate with the amount of labor involved.

In Minnesota opportunity has arisen for the investigation of a number of interesting conditions. B. typhosus and organisms very nearly allied to it have been isolated from a number of rather unusual sources, such as the Minneapolis water supply, chronic sinuses and acute abscesses, the meningeal exudate in a case of cerebrospinal meningitis following typhoid and from the gall bladder at operation. From the tissues of a foetus expelled at the end of five months in the third week of typhoid fever in the mother, and from the bodies of flies during an epidemic of typhoid in the Fifteenth Minnesota, U. S. V., types of bacteria were obtained which resembled in almost every particular B. typhosus.

Most, if not all, of the states and provinces mentioned as doing diphtheria diagnostic work afford also opportunities for examination as to the presence of the Widal reaction.

TUBERCULOSIS.

In many laboratories the sputum of persons in whom pulmonary tuberculosis is suspected, is examined gratuitously. The Minnesota State Board of Health in 1898 took the position that since tuberculosis was not at that time a disease in which notification to the health officer was compulsory, examinations of sputum should not be undertaken excepting under certain conditions. A number of consultants in the state objected to the

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State Board of Health making gratuitous investigations unless the results of those investigations were utilized directly in the preservation of the public health and not simply as an aid to diagnosis, prognosis and treatment.

It seems highly desirable, however, that in all states, so far as it is possible, the example set by New York City be followed and an educational crusade undertaken. Should it be possible to obtain definite information concerning all patients suffering with pulmonary tuberculosis, the conditions under which they live, the opportunity afforded for the infection of others, and additional clinical and hygienic data upon which definite records can be built, it will become possible to prepare reliable statistics as to the distribution and spread of tuberculosis and efforts can be intelligently made for the stamping out of this disease by the education of the patients and those who are brought in contact with them. Of prime importance in this connection are the provision of sanatoria and the dissemination of the knowledge that tuberculosis is a curable disease.

Under these conditions, state board of health laboratories should undoubtedly make gratuitous examinations and report to local health officers and physicians where the conditions which must be made by the state authorities are complied with.

RABIES.

The work of the laboratory has shown the prevalence of this disease in Minnesota where its existence was denied until comparatively recent years. Frequently the first information concerning the occurrence of this disease comes through the forwarding to the laboratory of material for examination. Immediately inquiries are instituted, directions given and the laboratory investigation begun. During 1901-1902, thirty-three examinations and reports have been made. They vary in interest and importance. To show the distribution of the disease it may be mentioned that rabies has been diagnosticated by the laboratory in man, horses, cattle, sheep, swine, dogs and a wolf. In one instance a history was given that one mad dog was responsible for the death by rabies of sixty-five cattle. On one farm in Minnesota, the farm bitch, supposedly infected from the

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bite of a skunk, was responsible for the development of rabies and death therefrom in her two pups, the cat, one pig and eight cows, whilst the owner, owing to exposure to infection from a scratch from the tooth of one of his cows, received the Pasteur treatment and remained in good health. Examinations were made and a positive diagnosis of rabies given after the development of rabies in rabbits inoculated from a number of the above animals. In one instance, the presence of rabies virus was demonstrated in milk which came from a cow five days before, i. e., twenty-four hours before she succumbed to the disease.

WATER.

The investigation of the public water supplies of a state is a matter which requires the most careful consideration. In the more thickly populated districts where habitations are very close together, and through household sewage and commercial enterprises the streams, lakes and other natural water supplies are in danger of being rendered useless, the necessity for the protection of public supplies is very apparent, although it should be just as obvious in all localities. As a rule, however, it is not until conditions have arisen which have no right to exist in any civilized community that any interest is betrayed in this matter.

The work of Massachusetts in connection with water supplies and sewage disposal is a model to the world. During 1902, this state spent nearly $34,000, and has in its employ a staff consisting of twenty-five members, including engineers, chemists, biologists, bacteriologists, clerical and other assistants. Not only does the Massachusetts State Board of Health examine at frequent and fixed intervals water samples from various portions of the state, but when a new water supply is to be instituted or change made in the existing supply in any locality, special study is given to the conditions which have to be met in that locality. The engineers and laboratory men are sent to or stationed on the ground for the necessary length of time to determine the best methods of dealing with the particular local problems presented. The experimental plant at Lawrence, Mass., need not be mentioned since its work is known all over the world. Ohio, Connecticut, and other states are following along somewhat the same lines. In Minnesota it was impossible to undertake this work

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upon the scale demanded but a beginning has been made in a modest way by an attempt to make a chlorine survey and map of the state and by examining chemically, samples of water forwarded by different localities and where epidemics arose or where, after careful investigation by the local authorities, there seemed a reasonable ground for suspecting the water supply, a chemist or a bacteriologist or both have gone into the field to undertake examinations and collect data. Employment of competent engineers has been urged upon all local boards of health where a change in existing or the installation of a new water supply was contemplated, since the Minnesota State Board of Health has the authority to condemn water supplies. It is hoped that ample provision will be made for the carrying on and extension of this work in Minnesota.

A chemical and bacteriological survey of certain of the rivers and lakes is contemplated. In fact, a beginning has been made upon this work.

There is nothing more important than the proper supervision of public water supplies, and concerning the capacity of laboratories in this connection there is a great deal of misconception. The forwarding of miscellaneous samples by people unskilled in the work, especially where data is not available, usually leads to disappointment and may be positively harmful if definite action is to be based upon reports thereon.

In no work is the presence of the laboratory man in the field more demanded than in the investigation of water, if he is to make an intelligent report. Such report is to be interpreted and acted upon by a competent engineer where public water supplies are in question. Too often this matter is left to a laboratory man, the local health officers or a board of aldermen; whereas, it demands the collaboration of engineer, chemist and bacteriologist.

OTHER LINES OF ROUTINE AND RESEARCH INVESTIGATION.

The problems which have to be met in any locality necessarily vary, and during the history of the Minnesota State Board of Health laboratory it has been found necessary to undertake a great many different kinds of work which cannot be given

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within the limits of this communication. A better idea may perhaps be obtained by a few specific illustrations.

1. MEAT.—The examinations of meat have usually been unsatisfactory owing to the paucity of the data and the method of collection and transmission. In one instance, living hog cholera bacilli were demonstrated in salted pork, of which a specimen was forwarded by the health officer because it had caused illness in his own family. It later transpired that in a herd of hogs which had been fed in the vicinity of the slaughter house, a disease had broken out and that suddenly the hogs disappeared, and it was presumed that these animals had been disposed of by pickling.

An illustration of the utility of the laboratory in matters of this kind, particularly in relation to animal disease, is afforded by the result of one investigation. The health officer (a physician) in one of the towns in Minnesota, observed in a butcher shop a small portion of tissue adherent to the ribs of a beef carcass. This was removed and sent to the laboratory. The piece of tissue was apparently a calcified lymphatic gland. Decomposition was so far advanced that nothing could be determined from a microscopical examination. Inoculation of two guinea pigs demonstrated the presence of B. tuberculosis which produced the disease in these animals and in their tissues the bacilli were demonstrated microscopically. The health officer made inquiry regarding the origin of the meat and found that it came from a farm where thirty-two cattle were kept, and the owner being desirous of knowing exactly the condition of his herd submitted them to the tuberculin test, whereupon twenty-seven reacted. These were killed under inspection and found to be badly diseased.

2. MILK.—Relatively little work in the laboratory examination of milk has been done, though it is hoped that the State Board of Health may be able to encourage the establishment of dairies from which "certified" milk will be sold. Under these conditions, occasional laboratory examinations will be made of the milk which comes from such dairies. In addition to the laboratory examinations, veterinary inspection of the herd and general supervision of the hygienic surroundings of the dairy

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will be undertaken so that any departure from ideal conditions with respect to the milk, the animals or their surroundings, will result in the cancellation of their certificate.

3. In connection with the Minnesota State Funeral Directors' Association, the State Board of Health has undertaken the investigation of what constitutes satisfactory embalming. The two aspects investigated have been: (1) the undertakers' point of view—the aesthetic side—and (2) the public health point of view, i. e., whether embalming as done under certain conditions results in the destruction of all micro-organisms within the body. It would seem that many of the methods employed and certain of the solutions used are not reliable. This work is not yet complete. As an illustration of the unreliability of methods of embalming, the case of a boy who had died of rabies and whose body was embalmed shortly after death, may be mentioned. The method employed was the injection into the viscera and into the cavities of formaldehyde solution, but several hours after embalming material was removed from the brain and medulla and upon subdural inoculation into rabbits, rabies virus was demonstrated.

4. Research work which has been accomplished by members of the laboratory staff includes the investigation of the etiology and pathology of "spotted fever," undertaken by Drs. Wilson and Chowning in connection with the State Board of Health of Montana. The hitherto unknown cause of the disease has been shown to be a micro parasite somewhat akin to malaria and more nearly resembling the haematozoan of Texas fever in cattle. There seems to be good evidence to show that this is transmitted to man by tick bites.

The study of obscure septicaemias, tetanus, cerebrospinal meningitis and other diseases in man has been undertaken as opportunity arose.

5. The care of infectious diseases of animals has been in the hands of the State Board of Health in Minnesota and a very great proportion of the time and energy of the laboratory staff has been spent in their study. This has afforded in many instances a better understanding of the processes in human disease,

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and has rendered possible the control and the study of those diseases which are common to both men and animals.

It is not fitting at this time to discuss in detail the study of animal diseases except in so far as they relate to analogous processes in man.

In Minnesota a number of opportunities for studying hitherto undescribed diseases of animals, or those in which little was known of the etiology, have arisen. The study of a large number of outbreaks of what seemed at first an unknown acutely infectious disease revealed the fact that haemorrhagic septicaemia in cattle was very prevalent, since when it has been found in other states. In cerebrospinal meningitis of various animals, a diplococcus resembling if not identical with diplococcus pneumoniae has been demonstrated. The disease known as swamp fever in horses is at present under investigation, and it would appear that this is an infectious process due to specific micro-organisms which have been isolated from many animals and which are being used in an endeavor to produce artificial infection and immunity. Some interesting observations upon infection with tuberculosis and glanders have been made during the last year, and three cases of human glanders have been studied. In such diseases as tuberculosis, glanders, actinomycosis and anthrax, it has been possible by collaboration on the part of the executive, veterinary and laboratory departments, to demonstrate more than once the occurrence of these diseases in both men and animals. The possible infection of man from animal sources renders it very desirable that the State Board of Health have control of the infectious diseases of both men and animals, since the problems relating to the etiology and hygiene are to be solved along the same lines by the same means.

The presence here today of the leading medical men of Iowa, and the interest evinced in the protection of public health, is a sufficient comment on the unselfishness of physicians who show themselves ever ready and eager to aid in the prevention of disease.

In Iowa there are many laboratories at the present time in which most excellent work is being done, and I have inferred from the remarks of the previous speakers and from the invita-

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tion extended to me to be present today that the State Medical Society wishes in every way to aid in the establishment of a state laboratory for the investigation and suppression of disease and unsanitary conditions

In the establishment of a laboratory, I feel quite sure that Iowa will remember that such work cannot be carried on without adequate appropriation. Laboratory work in medicine to be of value must be done by reliable men of thorough training. The value of a state laboratory can be enhanced many times by the provision of some means whereby health officers and others interested in sanitary measures may be educated along certain lines which are of comparatively recent development.

Routine and investigation work are both expensive and it is very frequently necessary in order to secure the best results, in fact, sometimes in order to secure results at all, that the laboratory workers go into the field or that temporary laboratories be established during the investigation of any particular problem. If this work is to be carried forward on the very best possible lines and attempts are to be made to aid local health officers and to provide special training in sanitary lines for them, a considerable sum of money must be appropriated. It is difficult, indeed, to estimate the value of such work in commercial terms, but the value is not less because of inability to state it in dollars and cents.

I sincerely hope that it will be found possible to meet all the needs of this state and I feel quite sure if suitable financial provision be afforded, the medical fraternity of Iowa will see to it that the state gets the very best possible return for the money invested.

Discussion on the Papers of Drs. Bierring and Wesbrook.

DR. C. F. WAHRER, of Fort Madison.—*Mr. President:* The two papers that have been presented meet with not only my fullest endorsement, but I hope for better things to come. In time of peace we should prepare for war. Let me repeat the words of a distinguished gentleman from a neighboring state, who stated that we have a wealthy state: that we are part of a

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wealthy nation that has much money, and much of it is used for purposes that do not benefit mankind. And let me ask that the members of the medical profession of the state of Iowa use their influence for all it is worth in their individual communities on the legislators and get them interested in this kind of work, so that we may finally realize the happy dream foreshadowed by these gentlemen in their papers.

DR. D. C. BROCKMAN, of Ottumwa.—I would like to ask Dr. Wesbrook as to what the probable expense would be to put in an equipment sufficient to make an examination of the water supply of Iowa, and what he would expect the annual running expenses of such a laboratory would be, making provisions for investigating the water supply of all cities in Iowa that are furnished with water works? Of course, an estimate can only be an approximate one, but it is well to know this, in order to know how much to ask the legislature for.

DR. F. W. POWERS, of Waterloo.—It may be news to some of you to know that at the last meeting of the legislature a bill was introduced before that body creating a state laboratory for bacteriological and chemical work. Some of the physicians there aided us very much in securing the passage of that bill before the house. I believe it passed the house with one negative vote. In that bill we asked the legislature for $7,500 for the purpose of starting a laboratory building; if we could secure a sufficient appropriation to start it, it would soon demonstrate its usefulness, and that future legislatures would take such care of it as was necessary.

I am fully convinced, after listening to this very instructive paper, that we will need more money than that to properly carry on a laboratory that would meet with the approval of our citizens. It seems difficult, however, to secure from the legislature any funds for medical purposes. There is a constant rivalry between the medical schools, and between the contending factions relative to medical questions, so that when a final vote is taken, there is something that interferes with the appropriation. When the bill came before the senate at the latter end of the session, it was called up inadvertently one night when there was hardly a corporal's guard present, and accordingly there was sufficient

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opposition to defeat it. Had it been handled with reasonable tact upon the floor of the senate, no doubt its passage would have been secured, because we would have had plenty of votes to pass it if the members were present. We shall try to effect its passage again next winter. I want to urge to you to influence as much as possible the members of the house and senate from your respective districts in regard to the passage of this bill. I personally appeared before every committee that had this bill in charge last winter; it has to come before several committees before it comes up for passage. It had to go before the public health committee, and after its approval there, it had to go before the committee on appropriation, and then it went through a similar process in the senate. I assure you I felt both disappointed and chagrinned when I heard that our first love had finally met its defeat in the senate.

DR. WESBROOK (closing the discussion).—I cannot give even an approximate estimate of the cost of erecting such a laboratory in this state and fully equipping it, as I am unfamiliar with the conditions here. I may say, however, that in one state an annual appropriation of $10,000 was asked for for the purpose of running the state laboratory. This was the original request, and it was cut down to $8,000 at the beginning. This state laboratory now gets $10,000 for annual expenses and $2,000 for equipment. In connection with these laboratories the traveling expenses would be quite an item, because, as I have indicated in my paper, a great deal of the work will necessitate the traveling of laboratory representatives, also the carrying of a considerable equipment out into the field.

I have not given the water works serious attention heretofore in our state. Of course, I know what has been done in other states, and we have done what we could in our own state. In many of the larger cities these matters could be taken care of by the city in collaboration with the State Board of Health. But in survey work the State Board of Health should determine what are the potable waters of the state and what can be done to make those waters potable which are not potable at the present time.

Using the rivers as we do in this country, as open sewers for the country, we cannot expect to get good quality of water

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for this purpose. Not only in regard to water, but for sewage disposal, I should imagine the best way would be for a state to secure a generous appropriation, select a proper person to run the laboratory, have him under the direction of the State Board of Health, let him outline the work, and determine the approximate cost. Of course, such a man should be familiar with the physicians of the state.

If there are any specific questions that may arise, I should be glad to make them clear. I regret that I cannot give you any more information than I have.

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Section of Obstetrics.

REPORT OF CHAIRMAN A. J. HOBSON.

It is not my purpose in this report to duplicate material that will appear in the regular program, nor to tire you with an exhaustive review of technical points in obstetrics. Neither have I any new theories to advance. I want to emphasize some important points that will not be brought out by the essayists.

The science of obstetrics has been of tardy yet gradual development. Though long neglected it is coming year by year to occupy the place its importance rightfully demands.

Accuracy in diagnosis, and our best efforts to spare no pains in putting the prospective mother in the best possible condition to withstand the pangs of labor and the strain of lactation, has greatly reduced the mortality of childbirth.

Spinal Anaesthesia.—Cocainization of the spinal cord has been tried and spoken of in glowing terms as a means of inducing analgesia during parturition, but the mortality has been too high to admit of its ever coming into general use.

Puerperal Septicaemia.—With our more perfect knowledge of antiseptic and aseptic operations, this most distressing disease is becoming much less common. Every case of puerperal sepsis can be traced to gross and almost criminal negligence on the part of some one, either the patient herself, the attendants or the obstetrician. Every pregnant woman should be assured there is no danger of sepsis unless some mistake has been made, and she should be instructed to have sterile pads, napkins, absorbent cotton, etc., in readiness.

The doctor and nurse should be as particular about their hands, rubber gloves, operating gowns, etc., in a case of obstetrics as they are in a laparotomy. In spite of all this care some mistakes will occur, and there will still be cases of puerperal septicaemia. When it does occur it requires the utmost care and skill on the part of the attending physician. If there is retained membranes or portions of placenta in the uterus they should be removed at once, either by the finger or the curette and intra-

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uterine douche. If we are sure the uterus is entirely emptied, or after we have assured ourselves, by one curetting, the curette should under no circumstance be used again, as it opens up new avenues for the absorption of the septic material into the general system. The intra-uterine and vaginal injection is a most valuable aid and should be used freely.

Within the last few months we have been very much interested in the reports on the intravenous injection of a 1 to 5,000 formalin solution in all cases of puerperal and other forms of sepsis. The first reports seemed to indicate we had at last found nearly a specific for sepsis. As yet this formalin treatment must be considered as in the trial stage. We regret to say the later reports do not seem to substantiate the first claims of Doctor Burrows and his immediate followers. In fact some very careful observers claim all the benefit is derived from the normal saline solution which is used as the vehicle.

The subcutaneous injection of the anti-streptococci serum in puerperal and all other forms of sepsis has passed the experimental stage, it has stood the test of time, is growing in favor with the profession, and is proving itself a most valuable remedy.

Some very glowing reports have been made on the use of this serum, and notwithstanding the beautiful and gratifying reports on the use of intravenous injections of formalin solution first published, anti-streptococci serum is yet the best weapon we have to fight this most fearful infection. The reason and the only reason this serum has failed in many hands to accomplish the desired end is because of the small doses used. Time and experience has taught us that heroic doses and only heroic doses do any good, and to accomplish results must be used. We have learned to use 5.000 units of antitoxin serum where we used only 1.000 when we first began treating our cases of diphtheria with it when the urgency of the case demands it; so, too, are we learning to use 10.000 units of anti-streptococci serum where formerly we feared to use 1.000. We do not use anti-streptococci serum, as a rule, until we have exhausted all other means first, and have allowed our patient to become thoroughly saturated with the toxine. It follows, as night the day, that the greater amount of toxine we have to neutralize or antidote, the

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greater the amount of antitoxin we must use to do it. Hence I repeat that time and experience has taught us that our failures heretofore in many cases have been due not to the uselessness of the anti-streptococci serum, but to our ignorance of its exhibition.

Puerperal Eclampsia.—The theories of the causation of this most alarming complication are as yet very unsettled. Anaemia of the deeper portion and congestion of the surface of the brain, due to increased arterial pressure resulting from the accumulation of poison in the mother's blood, seems to be the most plausible explanation. Excretion may become insufficient by reason of kidney of pregnancy, nephritis, or pressure on the ureters. Venesection and veratrum viridi to lower the blood pressure, with chloroform to control spasms, are the first indications; later chloral per rectum, free catharsis by salines, intravenous or subcutaneous injections of normal saline solution, and if labor has commenced empty the uterus as quickly as possible.

Placenta Praevia.—The placenta is said to be praevia when it is attached to any portion of the lower uterine segment. It occurs about once in 1,200. The cause is as yet not satisfactorily explained; pre-existing endometritis has been offered as an explanation, but cases have occurred where there was no evidence of any previous uterine trouble. The profession is still divided as to which is the better plan, to bring on labor as soon as the trouble is diagnosed, or to use expectant treatment until after the seventh month and viability of the child. If the latter method is chosen, rapid dilatation by means of the colpeurynter with combined version should be performed. If there is much deformity of the pelvis, or obstruction to the rapid delivery of the child, Caesarean section at the hands of a competent surgeon is the safer method.

Tumors Complicating Pregnancy.—Ovarian cysts should be removed as early as possible when they occur in the first months of pregnancy. If before the fourth month the operation rarely interferes with the normal gestation, after the fourth month the danger of abortion increases as pregnancy advances. While myomata are more apt to produce abortion, and in some cases dangerous or fatal hemorrhages, their removal is not so im-

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perative, the patient can often be tided over until after delivery or the viability of the child.

Carcinoma of the uterus complicating pregnancy in the early months demands an immediate and radical operation, if later the patient may be tided over until after the viability of the child, when a Caesarean section should be performed, with complete exterpation of the uterus.

Extra-uterine pregnancy still has its horrors for the mother, but in the hands of the surgeon of today is not the bugbear that it once was. That it occurs more often now than formerly is not presumable, but many more cases occur, not because the trouble is more prevalent but because the diagnostic ability of the average physician has increased in the last decade. I have had two cases in my own practice within a year, both making good recovery following surgical interference.

The treatment of ectopic gestation has undergone no change in the last twelve months, nor do we know any more of the etiological factors in this obscure process than formerly. The diagnosis is of the utmost importance. and on it depends the life of the woman in every case. A brief resume of the salient points in its diagnosis can not come amiss nor be too often reiterated. Whether the gestation be tubal. tubo-ovarian or tubo-uterine concerns us least. and the physician or surgeon who differentiates between them. ante-mortem or ante-operation, has diagnostic acumen par excellence. The symptoms are of utmost importance for by them do we usually make our diganosis. Careful bi-manual examinations should of course be made and repeatedly made, and when made following rupture of the tube often make our diagnosis absolute; but may when made at that time be too late to save the patient's life. Although few opportunities are presented for diagnosis previous to the rupture period such things have been done however, and whenever an examination of a woman in whom pregnancy is supected reveals a mass at the side or behind the uterus, we should be on our guard and at least suspect tubal pregnancy.

Any irregular symptoms of pregnancy, especially in a previously sterile woman, should immediately be thoroughly investigated and the cause of the irregularity be accounted for if

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possible. The usual symptoms of pregnancy occur in most of these cases, such as tingling and enlargement of the breasts, irritation of the bladder causing frequent urination, morning nausea, etc., and an irregularity if not a cessation of the menses. Any pregnancy in which the usual cessation of menstruation is not normal should arrest our attention and at least make us think of this formidable condition. The reason and the only reason why many of these cases are not diagnosed is because we overlook entirely the possibility of ectopic gestation even when the symptoms and signs are well pronounced. In other words, we are too apt to forget that such a pathological condition may exist in any pregnant woman, and even be present coincident with an intra-uterine pregnancy.

If the pregnancy develops as any other pregnancy develops until the patient is suddenly seized with excruciating pain in one or both sides of the abdomen, accompanied by the usual symptoms of shock or hemorrhage, such as loss of consciousness, feeble heart, cold perspiration, sub-normal temperature, etc., then we should certainly be able to make a diagnosis, for with such symptoms, and signs of boggy mass in pelvis, which is sure to be found if rupture and hemorrhage has occurred, the bi-manual examination being made under an anaesthetic if necessary, we can arrive at no other diagnosis than that of ectopic gestation.

To recapitulate then I would say, first of all do not forget the possibility of tubal gestation in any case of pregnancy, examine carefully into the history of the suspected pregnancy, taking into consideration menstrual disturbance of any character, especially in a previously sterile woman; consider and investigate the usual symptoms of normal pregnancy; examine the menstrual flux for shreds of membrane; and finally careful bimanual examination, usually safer and better done under an anaesthetic, for a foreign mass outside of the uterus, and if when found it has been preceded by symptoms of rupture, which is the case in the vast majority of patients, our diagnosis is made and our duty plain.

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NORMAL LABOR CONSIDERED FROM A SURGICAL STANDPOINT.

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There is no case of common occurrence that presents itself to the general practitioner of medicine, which requires all the demands made in a technical surgical procedure as in an obstetrical case.

It matters not how simple the case may be; if your labors are to be rewarded by anything like uniform success, there is required in each and every instance a thorough knowledge of a perfect surgical technic. In surgical practice, success does not depend so much upon the skill and dexterity of the operator, as upon his ability to prepare his case and the degree to which he is able to make and retain surgical cleanliness.

The object aimed at in all surgery is to prevent infection, for it is an apparent fact that no matter how skillfully a serious operation be made, success depends wholly upon the aseptic manner in which it is conducted, else we would hear the joust "The operation was a success, but the patient died," but they forget to add "from infection." This fling of satire could be aptly applied a few years ago, but today it reflects discredit, if not criminal neglect. Our labors then in obstetrics should be directed with a view to prevent infection; and this can be successfully accomplished.

When we recall the condition of the uterus immediately after delivery, with its vast bleeding surface, its large area of torn tissue, the gaping thrombosed placental sinuses, we are at once struck with its similarity to a wound located elsewhere, from whatever cause; and the frequently occurring lacerations of the cervix and perineum, when they are present, serves to make the analogy closer. And when we consider the mechanism by which the decidua is normally removed, we readily observe that a choice culture medium is prepared by nature for the reception and propagation of organisms introduced from without.

The later pathological investigations show that the diseased processes affecting surgical wounds and the puerperal genital

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tract are precisely similar, differing only in a slight degree by the peculiar conditions in each case. Thus we understand that puerperal fever is really puerperal septicaemia, and is due to the entrance into the lacerated tract of certain bacteria which are known to have definite pathogenic properties, and right in this connection it might be pertinent to ask, How do these bacteria gain entrance? Are any of them found normally in the genital tract? Does infection always occur from the outside? Can this be prevented in every case?

Formerly it was supposed that the vagina fairly teemed with bacteria, and the theory of autoinfection was advanced, but later investigations carried on by competent and careful observers show conclusively that the uterus is positively free from pathogenic bacteria, and in a state of health the vagina is equally so; this premise then, meets the first argument of autoinfection. The studies of Doederlin are conclusive and must carry weight. He found existing in the vagina an anaerobic bacillus which secretes lactic acid, which is antagonistic to staphylococci, and within certain limits destroys them; he infected the vagina of a virgin with large amounts of staphylococcus cultures, and in four days found it free of injected germs. From his investigations he formulated the following deductions:

First—All pathological secretions containing germs are weakly acid or alkaline.

Second—In puerperal women the vaginal bacillus disappears and in its place are found many forms of saprophytes, and the lochial discharge becomes alkaline.

Third—When the lochia ceases the saprophytes disappear, and the vaginal bacillus reappears; the vaginal secretion becoming intensely acid.

Dr. J. Whitredge Williams supports Doederlin's deductions, after continued observation and a study of other investigators. Kronig made 200 examinations of vaginal secretions, and failed to find pathogenic micro-organisms, he attributes the sterility of the vagina to the outward flow of the vaginal secretions. Menge thinks the germicidal action is aided by the anatomical elements of the vagina, and holds that there is a marked leuco-

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cytosis due to the irritation of the vaginal wall, and that this is followed by a subsequent phagocytosis.

Having sufficiently considered the uterus and vagina, let us enquire into the state of the vulva. Dr. J. Clifton Edgar, of New York, gives us a careful bacteriological study of this region by a series of results found in examining the vulva of pregnant women; of thirty cases examined, he found the staphylococcus eight times, staphyloccocus aureus three times, streptococcus once, sterile nineteen, coli communis none.

This table shows presence of pyogenic bacteria in about 40% of the cases he examined. This report is very valuable to us, since it gives a clue concerning the location of the infective agents; this has been used in support of the autoinfection theory, but can scarcely be given much importance in that relation, when we consider the fact that the vagina is the only route from the vulva to the uterus. We have also found that the vagina has certain bactericidal powers in health; but we have also seen in the foregoing that in the puerperal state the secretions of the vagina become alkaline, and as the sterility of the canal is dependent upon the acidity of the contents, we find that instead of there being any defense for the culture of pathogenic bacteria, that it has become a perfect culture media for them. Dr. Matthew D. Mann, of Buffalo, ascribes the alkalinity of the secretions after labor as due to the large amount of blood serum which is poured out, and to the absence of the bacillus vaginae, which seems to be destroyed after labor.

As another argument against the theory of autoinfection we might mention the results of douching before and after labor. It would certainly seem that if the vagina contained pyogenic bacteria, that thorough douching would give better results than where the douche is omitted. Just the opposite of this, however, is true as shown by the labors of Leopold; he used the douche faithfully and well in 5,784 cases, and in 17.6% of this number there developed an infection; in another series of cases he confined 4,088 women and without the douche at any time during the puerperium and had infection in but 7.8%, or a decrease of nearly 10%. Undoubtedly the greatest argument in this matter is the results obtained by several large hospitals in this country,

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where great care is given to the patient and surgical cleanliness is thoroughly maintained, and in my opinion these reports conclusively prove the fallibility of the autoinfection theory, because if such a thing as autoinfection were possible then these results would be impossible, since a certain proportion of these cases would be infected, notwithstanding the greatest care. Following is the list:

Sloan Maternity, no mortality from sepsis since its foundation.

New York Maternity, 1,321 cases, no mortality from sepsis.

New York Post-Graduate, 850 cases, 1 death from sepsis.

New York Polyclinic, 450 cases, no deaths from sepsis.

Preston Retreat, 480 cases, no deaths from sepsis.

Boston Lying-In Hospital, 2,194 cases, 1 death from sepsis.

University Hospital, Philadelphia, no deaths from sepsis in nine years.

The foregoing certainly reflects great credit on these institutions. Especially is the work commendable in those hospitals wherein there has occurred a death from sepsis, and the case was successfully isolated and was not communicated to other patients; this speaks volumes for their aseptic preparation, for it is generally accepted that sepsis is contagious by inoculation, and only rigid preparation can prevent it.

In 1847, Ignatius P. Semmelweis, at that time an assistant in the Lying-In Department of the Vienna General Hospital, endeavored to find the cause of the high mortality rate that existed in his service.

He was not slow to discover that this high rate was greatest in the students' clinic; these men were constantly engaged in dissecting, and at the same time pursued their studies in the maternity wards, without any especial cleansing of their hands. At this time nearly 10% of all the women confined in this branch of the service died from infection.

In the midwives' clinic the mortality was but about 3%. Prolonged or complicated labor in the students' clinic was invariably fatal, while in the midwives' clinic the length of time or the occurrence of complications did not materially increase the death rate. He also noticed that women who had been delivered

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before admission and even when unattended, escaped infection. About this time one of the professors died from an infection received during dissection, and the symptoms presented by his associate were so similiar to those who were dying in his service, that he thought it was more than a mere coincidence, and sought the cause. He began by requesting the students to thoroughly wash their hands in chlorine water, and restricting the number of vaginal examinations. This action was promptly followed by a rapid decrease in the mortality rate, and in a very short time the death rate of that service was less than 2%.

Thus it was that Dr. Semmelweis gave the world the pioneer work in modern obstetric asepsis and antisepsis, although he did not give it this name. His work has been faithfully carried out and enlarged by such men as Holmes, Lister Tait, Doederlin, Williams, Edgar, and others familiar to all present.

The work done by the earlier men in this line was not well received. The entire profession hooted at the idea advanced by Semmelweis, he was made a target of ridicule and malignant opposition, and being a sensitive soul, fretted himself insane. He could not stand the criticism advanced after he had such ample proof of its authenticity, and curiously enough he died of an infected wound received during a septic operation, just in time, however, to prevent the humiliation of being committed to an insane asylum.

The honor of advancing these ideas in America belongs largely to Dr. Oliver Wendell Holmes. In 1843 he wrote an article in which he states that "Childbed fever is a contagious affection and is preventable and owes its origin to either the attendant or nurse." These views were not accepted, and exerted very little if any influence. At the time they were rigidly opposed by the eminent men of the times, especially by Meigs and Hodge, of Philadelphia, Meigs declaring that he preferred to believe that puerperal infection was due to the workings of a Providence which he could understand, rather than due to an unknown infection which he could not understand. It is strange that both Semmelweis and Holmes experienced the same opposition, when each had labored so faithfully and well to serve mankind by robbing it of one of the greatest horrors assailing that

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sacred state of motherhood. At the meeting where Holmes read his second article, the discussion brought out a torrent of abuse and ridicule, and headed as it was by such men as Hodge and Meigs it can hardly be readily understood how men of lesser degree ventured opinions furthering the abuse, since they considered the leaders of the discussion paragons of medical learning. The condition then was very much as it is today, each man has a certain following. Holmes' reply to them will always be considered a classic, and I feel that I can well afford to take time here to quote it to you. Addressing the chairman he said: "I have no wish to express any harsh feeling with regard to the painful subject which has come before us. If there are any so far excited by the story of these dreadful events that they ask for some word of indignant remonstrance to show that science does not turn the hearts of its followers into ice or stone, let me remind them that such words have been uttered by those who speak with an authority I could not claim. It is as a lesson rather than a reproach that I call up the memory of these irreparable errors and wrongs.

"No tongue can tell the heart-breaking calamity they have caused; they have closed the eyes just opened to a new world of love and happiness; they have bowed the strength of manhood into the dust; they have cast the helplessness of infancy into strangers' arms, or bequeathed with less cruelty, the death of its dying parent. There no tone deep enough for regret, and no voice loud enough for warning. The woman about to become a mother, or with her new born upon her bosom, should be the object of trembling care and sympathy wherever she bears her tender burden, or stretches her aching limbs. The very outcast of the street has pity on her sister in degradation, when the seal of promised maternity is impressed upon her. The remorseless vengance of the law brought down upon its victim by a machinery as certain as destiny, is arrested in its fall at a word which reveals her transient claim for mercy. The solemn prayer of the liturgy singles out her sorrows from the multiple trials of life, to plead for her in the hour of peril. God forbid that any member of this profession to which she trusts her life, doubly precious at that eventful time, should hazard it negligently, unadvisedly, or selfishly."

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Passing now from the discussion of autoinfection, we will briefly consider the forms and the source and character of the pyogenic bacteria introduced from the outside.

By far the commonest source of infection is produced by the saprophytes. These are organisms developed on decaying matter, they abound in the faeces of parturient women, and find culture material in the blood clots, bits of placenta and membranes. They cannot be said to be truly septic in their action. Theirs is rather a role of decomposition, as they do not at any time enter the circulation, but produce certain toxins, which in turn give rise to certain symptoms; they are mostly of an anaerobic nature, and cannot be cultivated on the ordinary culture media, and no doubt consist of many forms, which as yet have not been identified; hence the term saprophytes is a general one, and does not signify any certain forms of bacillus.

Their action on the uterus and vagina is equally vague and obscure, many of them are gas producers, and give rise to the frothy and foul smelling secretion present in these cases. We can well understand how thoroughly Semmelweis conducted his labors in this direction by reviewing an article published by him just before his death, in which he states:

"The bearer of the decomposed animal-organic material is the examining finger, the operating hand, instruments, foul bed clothes, impure air, sponges, etc. In other words, the bearer of the decomposed animal-organic material is anything which is soiled by a decomposing animal-organic material and afterward comes in contact with the genitals of these patients."

While these saprophytes then are local in their action, the state of lowered resistance induced by their presence makes it a most favorable condition to be followed by a true septic infection, and while the condition of sapraemia may be easily controlled; if a true septic condition should develop, then it would become a grave state indeed.

The truly pyogenic organisms that cause infection may be briefly summed up as follows:

Streptococcus, the usual cause of the fatal and epidemic form produces no evidence of decomposition, the discharges are much lessened in amount or entirely absent and free from odor,

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reproduces itself very rapidly, and extends along the lympathetic routes, gains entrance into peritoneum and gives rise to symptoms of general sepsis.

Staphylococcus, is usually associated with the streptococcus, thus giving us a mixed infection. The s. aureus is the usual form observed in the infection of this condition, while the s. Albus and s. citreus play little or no part in its production. However, it may be well to state in this connection, as Williams has pointed out, that while the streptococci are usually the causative agents in puerperal infection, they are not necessarily the only organisms concerned in its production, it being clearly shown that most of the pus-producing organisms found in wound infection may also be found in puerperal infection.

Gonococcus, causes a mild infection when found alone and unmixed. Kronig was able to cultivate gonococcus in 50 out of 179 cases presenting a mild febrile course. None of these cases resulted in death.

Bacillus Coli Communis, is mild in its action in this location. Vignal states that one decigramme of faeces contains about twenty million of colon bacilli, and when we consider the close proximity of the parturient canal to the rectum, sometimes bulging by the pressure of the head downward, and the practice of some men to assist the delivery by passing a finger or two into the rectum to make pressure, we can readily understand how obstetrical asepsis can be compromised.

The foregoing are the commonest forms and I will not weary you by a recital of the other bacillus found, further than to merely mention them: Klebs-Loeffler, pneumococcus, bacillus aerogenes capsulatus, or gas bacillus, and bacillus typhosus.

Thus we have found in the foregoing that the uterus after labor presents exactly the same condition as a surgical wound; that the diseased processes affecting surgical wounds and the puerperal tract are identical; that the uterus and vagina in the pregnant state are sterile, and possess certain bactericidal powers; that the vulva lodges pyogenic organisms; that the vagina with its outward flow acts as a barrier to the introduction of these organisms into the uterus; that these organisms then are introduced into the tract from the outside; that any decomposed animal-organic material should be rigidly excluded.

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Therefore, we are now ready to take up the study of how these morbid conditions can be prevented, as the concensus of opinion among the men giving this subject the greatest thought, lead us to believe.

If there is anything which the preceding study proves beyond the question of doubt, I certainly believe it is this: In the point of technic, the practice of obstetrics is a surgical procedure.

The time to save your patient's life is when you are preparing her for and during confinement, not after the infection has taken place; for then your efforts will only too often be rewarded by failure and we will hear the refrain of the mournful note sounded by Dr. Holmes in that memorable reply to his cruel critics.

In beginning this crusade against infection, one of the most important necessities is the education of the patients to secure their attendant some little time before confinement in order that the room and other essential matters of preparation may be attended to in ample time, thus eliminating the danger by hurried preparation.

The room, if one can make a selection, should be light and capable of being freely ventilated, and the bed placed so that this may be accomplished without subjecting the patient to exposure to drafts.

Do not shut out the sunshine, sunshine is God-given and is valuable, lots of it however goes to waste for the lack of proper appreciation. Sunshine in itself is a bactericide of no mean potency, besides it adds much to the cheerfulness of the lying-in chamber; arrange the windows so that the direct rays are not in the eyes of either mother or child, but by no means exclude it altogether.

The furniture should be simple and plain, the bed should be arranged so that the attendant can approach the patient from either side; the bed linen should be fresh and clean and a simple hard mattress answers the purpose of confinement bed best; no feather bed should be tolerated, as they are animal-organic material, besides being unsanitary.

When the engagement is made sometime previous to the expected time, have the patient secure about two yards of white

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table oil-cloth, this is to be carbolized at the time of labor, and a blanket or quilt rolled tightly from end to end and pinned in the shape of a horse-shoe and placed transverse the bed, the oil-cloth laid over it, arranging the depression in the quilt so that the hips may rest therein; this will place one of the edges of the folded quilt under the back and prove a very grateful support to the tired back, the other edge of the roll is far enough from the vaginal outlet as to not in any way interfere with the delivery of the child; the loose ends of the oil-cloth are then gathered into a suitable vessel at the edge of the bed. Thus we have an arrangement that is capable of being made more aseptic than a Kelly or a Morrison pad, and at the same time eliminates the grave danger of carrying infection from one case to another, and another great recommendation is the small expense.

It is well also to instruct the family to have four towels securely wrapped in unbleached muslin, and thoroughly baked in the oven of an ordinary cook stove for about an hour, then laid away for use during the confinement; this process quite effectively sterilizes them, and wrapped as they are will remain so until needed. A couple of wash bowls will be required, but in the emergency two ordinary basins will answer the purpose, providing they are clean.

The patient is prepared when possible by a thorough bath, rectal enema and catheterization; where it is impossible to attend to the bath, by no means neglect emptying the bladder and especially the rectum, for should involuntary evacuation of the bowel take place by reason of the pressure exerted by the descending head, the previous preparation counts for nothing, and extreme care will be required to prevent an ensuing sapraemia, due to the action of the colon bacillus, hence it is altogether safer to attend to this matter deliberately than to be compelled to meet it in an emergency.

The woman should be attired in a fresh clean night-robe, and this can be rolled or folded up in under her arms, and an old but clean skirt snugly pinned about the patient just above the waist line; thus after delivery, by the removal of the soiled skirt and our improvised confinement pad, we have our patient in a clean bed, with clean clothing, without disturbing the peaceful rest so highly prized after a long and tedious painful labor.

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The attendant should be gowned in a white sterile gown, which answers the double purpose of preventing his clothing from being soiled as well as protecting the patient from a possible infection from dust and other material that could arise from contact, it also adds much to the aseptic completeness of his work. I will mention the preliminary vaginal douche only to condemn it, the studies of Læopold and others so conclusively prove that it is a dangerous procedure, and is only permissible, where after a bacteriological examination of the vaginal contents, or the secretion is found to contain pyogenic organisms, and right in this connection, let us consider the vaginal examination. Just so long as vaginal examinations are made, no matter how carefully we have attempted to disinfect our hands or the vulva, infection will occasionally be met; this is due to the fact that it is a very difficult matter to thoroughly sterilize the hands, together with the fact that the vulva not infrequently harbors pyogenic organisms. It is to be desired, therefore, that we limit the number of vaginal examinations as much as possible; little is to be gained from the vaginal examination except to determine the degree of dilatation of the cervix, and thus to make an estimate on the probable duration of labor. Leopold has advanced the idea that labor is best conducted by doing away with the vaginal examination altogether, and relying wholly on the external examination, claiming that the position can be determined with greater accuracy than by the vaginal route, and thus eliminating the grave danger of infection by either the finger or contamination from the vulva. One of the very first precautions taken by Semmelweis, we remember, was to lessen the number of vaginal examinations. The average accoucheur makes altogether too many of the examinations, and I have known men to sit with their finger in the vagina during almost the entire second stage of labor, believing that they materially assist in dilating the cervix. Perhaps they do, but the danger they take by infection greatly overbalances the good that they believe they are doing. The external examination has much to recommend it, it is perfectly harmless, and can be made as often as desired, and unlike vaginal examination, requires no hand disinfection.

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There is a great diversity of opinion as to the best methods of hand sterilization, some men even go so far as to state that the use of antiseptic solutions are of no value whatever. In a very interesting paper on this subject, Dr. Edgar R. McGuire, of Buffalo, has given some very practical suggestions regarding the disinfection of the hands. and has faithfully carried out some very convincing experiments; he closes his article by summarizing as follows: "First—Absolute sterility is impossible by any method. Second—Long continued vigorous mechanical scrubbing frees the skin of the larger numbers of bacilli. Third—The use of the ordinary solutions for antisepsis is questionable, and under usual conditions distinctly harmful. Fourth—The use of rubber gloves approaches the ideal." Dr. Wm. J. Mayo, of Rochester, Minn., declares that by scrubbing the hands we destroy the natural protection that has been provided for harboring of the bacilli, and thus make them more in evidence; he advises and uses the mere thorough washing of the hands in a lather of castile soap, and does not touch a brush to the surface. Dr. Joseph Price, of Philadelphia, some time ago suggested the use of ordinary mustard flour, used with green soap rubbed into a paste, the water frees the volatile oil of mustard, which is known to be the most effective vegetable antiseptic known, Dr. Roswel Park has added to this the ordinary corn meal previously sterilized, this acts as a mechanical aid to the mustard paste, and gives it unsurpassed utility, since it is not enough severe to destroy the outer layer of the skin which protects the resident bacilli.

Personally, I prefer this to any other method. It does not leave the surface of the skin rough, it is usually found in all households, and it is efficient, in obstetric work; however, it is well to substitute some of the liquid preparations of soap for the green soap—when you carry your soap in a bottle, you cannot get your hands into it to infect it, this cannot be said of the other forms.

Before proceeding with the vaginal examination then, prepare your hands in the manner best suited to your own ideas, since there is no positive means of securing sterility; in emergency of precipitate labor simple washing in ordinary yellow kitchen soap

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with plenty of hot water is far better than no preparation at all. The vulva should be thoroughly cleansed by the nurse while the attendant is preparing himself; this should be done with every care, remembering that it is the material that is carried in from the outside that produces the unfortunate complications, and the best and easiest way out of the difficulty is to prevent their occurrence; after the hands and vulva are cleansed, I use a gauze pad, with a slit in the center, to protect the vulva while the finger enters the vagina, these pads are made of four thicknesses of gauze, about eight inches square, and are wrapped in packages of eight and sterilized, then carried in my obstetric bag for use. The nurse places one of these pads snugly in the vulva, and the examination is made through the slit in the center, in this way the parturient canal is protected from the usual source of infection so far as the mother is concerned.

After delivery the placenta should be expressed, there being no occasion to introduce the fingers again into the vulva or vagina, and as the route of expulsion is outward there is no danger of infection from that source, unless the hand or fingers are introduced, and this will not be necessary unless there is an adherent placenta, in that event the entire arm to the elbow should be prepared thoroughly, and the placenta removed.

The responsibility does not cease with the termination of labor, every precaution should be taken to secure a tranquil puerperium; the napkins to receive the flow should be sterile, and clean cloths which have been boiled and ironed are sufficiently sterilized to answer the purposes, as the flow is outward, and infection is not likely to occur. When it can be arranged, it is best to have pads made of absorbent cotton enclosed in layers of gauze, these can be sterilized and after using destroyed as the expense is small, and it is much more positive and adds to the surgical completeness of the after treatment.

The care of the child is not less in proportion than that of the mother. There are certain responsibilities that will reward the attendant if well and aseptically performed, and the penalty for neglect is correspondingly simple or grave as the case may be; of course no obstetric attendant would neglect the eyes of the infant in this age, but there may be a temptation to neglect

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the surgical technic regarding the cord, and grave complications follow neglect here, a case occurring in my own practice well illustrates the danger.

Charles Edgar A., full term child, and delivered after a very brief labor, no instruments, eyes washed in weak sterile boric solution and cord dressed with plain sterile gauze, when ten days old had a black bowel movement of the consistency of tar; examination revealed a pneumonia of both lungs, temperature 106°, the umbilicus discharging and bleeding slightly, the umbilical depression was irrigated with a 1-2000 solution of bichloride and dressed with iodoform gauze, the pneumonia treated with a cotton jacket and stimulation, and with a lessening of the umbilical discharge the pneumonia subsided. This was undoubtedly a case of septic pneumonia. Other phases of umbilical infection may be mentioned, such as meningitis, inflammation of the umbilical vessels, peritonitis, osteomyelitis, arthritis, erysipelas and abscesses in the cellular tissue; thus we see that pyogenic infection of the infant, like infection of the mother, is a preventable disease, and its presence is invariably due to some failure to execute the proper surgical technic in connection with the delivery. The statistics of the Moscow Lying-In Hospital, published by Miller in 1888, shows that previous to the introduction of aseptic and antiseptic methods, from 6% to 8% of all the infants died from some of the many varities of infection, and that over 80% of these infections could be traced to the entrance through the umbilicus. Quite in contrast to these figures, the Sloan Maternity Hospital in New York does not report a single marked case of infection of the infant since its establishment.

From this comparison it will be evident that in the vast majority of cases the occurrence of infection is due to the negligence of either nurse or attendant.

The umbilicus then should be cleansed and treated like any other fresh wound, and with all the surgical care that would be given a surgical wound, their similarity is striking, only differing as to the cause and location. Dry dressing should invariably be used, and this should be positively sterile; there should be no doubt of this, and a simple manner of carrying sterile dressings

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for the cord is to keep a small jar of sterile gauze sponges in the obstetric bag and use them with sterile hands in making the umbilical dressings, around this can be wrapped absorbent cotton, but the practice of wrapping absorbent cotton direct from the commercial package is dangerous, and infection following is due to criminal negligence. Should suppuration occur in spite of all precautions, the wound is irrigated with a solution of bichloride in the strength of from 1-2000 to 1-3000, then dusted with iodoform and packed with gauze, or instead of dusting apply the iodoform in the form of gauze, but by no means use both, as the danger from iodoform poisoning is grave and children are peculiarly susceptible to this idiocyncrasy. The ligatures and everything that comes in contact with the abraded surface of the umbilical region should be thoroughly sterilized, and every precaution taken as in the dressing of a wound.

In closing then, permit me to recapitulate under the following heads: First—Success in obstetrics depends wholly upon your ability to secure and retain surgical cleanliness. Second—The same infective agents encountered in surgical practice are the causative agents in producing puerperal complications, and are only successfully combated by the employment of stringent aseptic and antiseptic technic. Third—Refrain from making numerous vaginal examinations, and when done, execute great aseptic care. Fourth—Don't wait until you are called to the case to make the preparations for confinement. Fifth—The practice of carrying a confinement pad is dangerous. Sixth—Sunshine in itself is a valuable germicide, do not exclude it. Seventh—Unless the vaginal discharge is known to contain pyogenic bacteria the douch is contraindicated. Eighth—Exert the same surgical technic in dressing the umbilicus that would be demanded in any other fresh wound. Ninth—Be clean, and be sure that you are clean; take no chances; by so doing you will reap a liberal temporal reward, besides having the serene satisfaction of knowing that you are serving humanity faithfully and well.

Discussion on the Paper of Dr. Pond.

DR. F. W. POWERS, of Waterloo.—*Mr. President:* It is hardly right to allow such a valuable paper as that which has

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been presented by Dr. Pond to pass by without extended discussion. The essayist is to be congratulated on its thorough preparation. It is such a great contrast to the paper which was read before this Society a few years ago at Cedar Rapids by a learned professor from one of our Southern cities, that I hardly know what to say. After listening to the paper at that time, and doing a country practice, I felt like going home and having an addition to my buggy, in order to carry the necessary paraphernalia for the ordinary case of obstetrics. Simplicity of preparation goes with simplicity in the technic of the operation. Simplicity of the neccesary accoutrements to have with you in your care and attention of the case is what appeals to you in this paper. You can go to any ordinary home and find all that is necessary, provided you are called reasonably early, to prepare the case for a plain obstetrical delivery.

As regards cleanliness of the hands, I am sure that in the ordinary transaction of business and attention to cases, something other than green soap will be found advantageous and easy to use, and in this connection I commend ordinary synol soap, which is put up in small bottles, easily carried in any grip, is antiseptic in itself, as well as a cleanser, and very beneficial.

What the doctor said as regards the bacteriological phase of the subject is interesting and instructive. He has devoted much time and labor to a thorough investigation of this question, and it is something that will do us all good to remember, and to carry on.

Dr. James R. Guthrie, of Dubuque.—There is scarcely a subject which could appeal to us more from a practical standpoint than the one so ably discussed by the paper to which we have just listened Some of my reasons for that belief are these: In the first place, if you will notice, the author discussed normal labor. Many of the practical papers we have had before this and other societies have discussed the abnormal phases of labor which are met with infrequently. This paper deals with the subject from a normal standpoint, and inasmuch as over ninety per cent. of the cases of labor belong to that category, this paper appeals to us as being of great practical importance. Again, the title of the paper strikes me with special significance. The author

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treats of normal labor from the standpoint of the surgeon, or normal labor considered from a surgical standpoint. Carrying out that idea and the exemplification of the title of the paper selected, right here is one of the most practical truths that can be received and carried home by us and put into active daily practice, namely, that we are dealing in the mechanism of normal labor, with a phenomenon that should be considered from the practical standpoint of the surgeon, and when so considered the idea of asepsis, the most promising, the most practical, the most fruit-bearing idea of a century is there exemplified.

Another important idea that was clearly carried out throughout the entire paper was the evil of meddlesome midwifery, and the uselessness—nay, more than that, the absolute violation of every rule of thorough obstetrical tenets—the frequency of internal examination.

There was another interesting question touched upon by the essayist, namely, that of autoinfection. The idea of autoinfection too frequently affords a simple screen behind which we can ease our consciences. Autoinfection, as compared with infection from without, is very infrequent indeed, and many cases of so-called autoinfection upon more thorough and careful examination are demonstrated to be due to a lack of cleanliness, lack of surgical technique, in the management of them. We recognize with pride the fact that the past forty years of modern medicine has been signalized by the word prevention, and I submit to you that here is one of the most fruitful fields for carrying out carefully and conscientiously that principle of which we are so proud.

Dr. J. G. Evans, of New Hartford.—I have been greatly interested in Dr. Pond's paper. He has covered the ground admirably. In reference to the Kelly pad, which I understood him to condemn, I think the Kelly pad can be used if it is used properly. If you boil it, you can sterilize it. The trouble is that most practitioners will not do that. They will not sterilize it properly—at any rate, not all of them.

With reference to the surgical gown, in the place of that I have been using for some time past a duck suit, consisting of coat and pants. Any practitioner will be surprised, if he wears

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them while treating his obstetrical cases, to see how much blood he will get on the lower part of his trousers, which shows conclusively to my mind that in these cases it is very essential for us to be as clean as possible, and when any blood gets on white duck pants, one can see it very plainly, whereas it is not so noticeable on black cloth pants.

The doctor's paper called to my mind several bitter things I have had to go through, not that I have not always tried to be clean in my obstetrical work, but for the past two or three years I have tried to be cleaner still. A little over a year ago I had a case which came under the head of abnormal cases. In this case there was an abscess over the sacral region, and the question arose whether it should be lanced and opened before labor or after it. I finally decided that it would be better to open this abscess after labor. In delivering the child by means of forceps, there was a laceration of the perineum, which was duly repaired, after which the abscess was opened. In opening the abscess I took all the precautions I could by using gauze and cotton to prevent germs from invading the parts, but was unsuccessful. My technique may have been faulty, because at the end of the third or fourth day the patient had a severe chill, followed by a mild attack of puerperal fever, from which she recovered. This abscess was deep and was probably tubercular.

The essayist spoke of introducing the hand into the vagina and removing the after-birth. This brought to my mind some cases in which this has been done. There is a great deal of danger attending the introduction of the hand into the vagina during labor. For instance, in those cases of breech presentation, or where version has to be performed, the introduction of the hand is a dangerous thing.

DR. POND (closing the discussion).—I wish to express my grateful thanks for the close attention maintained during the reading of my paper, and for the cordial manner in which you have received it.

In reference to the remarks made by Dr. Evans regarding the use of the Kelly pad, I did not condemn it, but merely said I substituted for it one which I believed is safer. Great care

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should be taken in carrying these pads and in boiling them thoroughly before they are used.

The suit which Dr. Evans suggested answers the same purpose as the gown I mentioned. The prime object in wearing a gown is not to protect our clothes, but to protect the patient who is susceptible from the ingress of any micro-organisms which might be harbored in a coat.

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REMARKS ON THE ETIOLOGY AND DIAGNOSIS OF PUERPERAL SEPSIS.

N. SCHILLING, NEW HAMPTON.

It is known that puerperal sepsis is infectious in its nature and that it is a preventable disease. Such knowledge applied practically should result in its eradication and render its consideration at this time unnecessary.

It requires but little investigation, however, to be convinced that a discussion of this subject is still of more than historical interest. Regarding the frequency of puerperal sepsis, W. H. Wiggin says: "It seems strange that we are obliged to admit that puerperal wound infection, in the ordinary daily practice of physicians, is of almost as frequent occurrence and is followed by as severe constitutional symptoms and with as high rate of mortality as it was fifty years ago." Ehlers makes the statement, that in Germany from four to five thousand women die annually from the effects of puerperal sepsis. Boxall comes to the conclusion that outside of lying-in hospitals the results in obstetric practice are as bad today as they were thirty or even forty years ago.

When we consider how "doubly precious" is the life of a woman at this time, it certainly becomes our duty to seek an explanation for a situation so deplorable. Theorists do not find the problem difficult to solve. In a great many journals and text book articles we find the following stereotyped expression: "The doctrines of asepsis have not yet permeated the rank and file of medical men." In other words, the frequency of puerperal sepsis in private practice is ascribed to the ignorance of the general practitioner. While it is not my purpose to extenuate our shortcomings, a feeling akin to resentment prompts me to say that such an allegation is untrue and unjust. To one familiar with the difficulties with which the doctor has to contend while conducting an average labor case, it is plain that the conditions which surround him are far from ideal and that therefore his results cannot be ideal. In a small dingy bed-room, with bed and

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patient destitute of everything that is clean, the thorough application of modern surgical principles is simply out of the question. Consequently infection of the genital tract will occasionally occur. That under the circumstances it does not occur even oftener may be regarded as one of nature's miracles. E. Bumm has the following to say in regard to this matter: "The main reason for the frequent inefficacy of antisepsis in childbirth lies in the very nature of the procedure itself, that is, in the difficulties encountered in carrying it out, especially in a private house. A surgical operation lasts a half an hour or possibly twice or three times that long, a childbirth lasts several and frequently many hours; surgical operations are undertaken in suitable rooms, childbirth occurs very frequently in the midst of the most unfavorable surroundings; only experienced and carefully prepared hands come in contact with the surgical wound, the wounds of the birth canal are touched by the uncouth hand of the midwife, who during labor has many other tasks to perform. When we bear in mind, further, how difficult it is to disinfect the region of the genitals and, owing to its proximity to the anus, how difficult it is to keep it disinfected, even for a short time, we really have no reason to be surprised at the undiminished frequency of puerperal sepsis."

To the "rank and file of medical men" this statement from so eminent an authority is consoling as well as instructive. Obviously he means to emphasize the fact that in order to eradicate this malady, in addition to a competent and painstaking accoucheur, the lying-in patient must be provided with a clean room, a clean bed, and a nurse who really knows what "physical and bacteriological cleanliness" means. In other words, in order to avoid infection during and subsequent to labor the same aseptic and antiseptic precautions must be taken that it is necessary to observe in the performance of a laparotomy. It may be urged that in private practice such elaborate precautions cannot be carried out. If such is really the case it is only logical to conclude that the mortality from puerperal sepsis will not be reduced. In that case fairness demands that our censors revise their decree. Instead of ascribing the bad results in obstetrics entirely to the imprudence or negligence of the "rank and file,"

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let them proclaim the fact that under present conditions, in many instances, it is simply impossible to utilize fully the principles of modern surgery in the conduct of labor. Let them exclaim with the poet: "Mit der Dummheit kämpfen Götter selbst vergebens." (With stupidity the very Gods contend in vain).

Let no one imagine that simply because he has attended a few hundred cases of labor without a death that his obstetric technique is perfect. A few years ago one of my professional neighbors assured me that in over nine hundred cases of labor attended, he had not had a single instance of puerperal infection. He very naturally felt proud of such a record. Furthermore, as many of these cases had been delivered under the most unfavorable surroundings, he was confident that his methods were equal to every requirement. When I reflect that few men are more competent and none more faithful in the performance of duty, it pains me to relate that this illusion has since been dispelled. It is not many months ago that I met him at the bedside of one of his lying-in patients who was suffering from a virulent puerperal infection from the effects of which she died eight days after confinement. Our superficial and uncharitable critics will not hesitate to render the verdict: "The doctor infected her." Is it not more likely that, for once, ignorance and dirt rendered his best efforts ineffectual? Had it been his privilege to attend this woman in a modern and well equipped lying-in hospital this precious life would have been saved and five little children would not now be motherless.

Any febrile condition during the puerperium is always regarded with a great deal of apprehension by the accoucheur. Even without much additional evidence he is apt to conclude that infection of the genital tract has occurred. And yet such an inference is frequently a wrong one. E. E. Montgomery pertinently remarks: "Not every woman who has an elevation of temperature following labor is necessarily septic, for the parturient state does not render her immune to the ordinary ills of mankind." It requires no very large experience to be impressed with the truth of this statement. Six days after having had a miscarriage which was completed by the aid of a sharp curette, Mrs. H. became very ill. She had slight chills, a low fever and

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cold sweats accompanied by anorexia, prostration, a frequent, small, irregular, soft pulse, intense headache, sleeplessness and frequent vomiting. The breath was foul and the tongue heavily coated. The urine was highly colored and scanty. Later tympanites developed. There was pain and tenderness over the entire abdomen, being most marked in the right inguinal region. Although vaginal examination revealed nothing abnormal, except some tenderness in the right side of the pelvis, to me it seemed plain that puerperal infection was the cause of this woman's illness. However, Doctor Landon of our city who saw the case with me, made this timely suggestion: "Continue the calomel, one grain every hour for eight doses. Follow this with a tablespoonful of a saturated solution of magnesium sulphate every hour until those bowels move some more." This heroic medication was finally followed by about a half dozen copious very offensive stools and resulted in the prompt recovery of our patient.

It needs to be emphasized that febrile diseases, other than puerperal infection, *occur very frequently* during the puerperium. At this time a latent tuberculosis may become active. The same may be said of cholelithiasis, gonorrhoea and malaria. H. S. Crossen, of St. Louis, in a partial report of 800 cases of labor, reported twenty-nine cases of decided puerperal infection and thirty-six cases of intercurrent disease. J. F. Moran, in a series of 555 cases, reports a rise of temperature above a hundred in 116 cases. In only forty of these, excluding seven cases of gonorrhoea, could the fever be ascribed to trouble in the genital tract. Mental excitement, sore nipples, engorgement of the breast, mastitis, influenza, scarlatina, typhoid fever, diphtheria, acute follicular tonsilitis, acute articular rheumatism, pleurisy, endocarditis, acute bronchitis, pneumonia, appendicitis, and retention of urine, are all conditions that we may be called upon to differentiate from puerperal sepsis. When we bear in mind that some of these conditions may be manifestations of a puerperal septic pyaemia it is apparent that in order to arrive at a correct diagnosis a great deal of care and skill must be exercised. A brief history of the following case will serve further to illustrate this fact. Four weeks from the date of her confinement,

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Mrs. C. suddenly became very ill. She had a severe chill, a decided elevation of temperature, anorexia, intense headache and pain in the muscles of the back and limbs. She complained of no symptoms that directed my attention to the genital tract. I made a perfunctory external examination of the abdomen and as palpation elicited no tenderness I promptly and confidently made a diagnosis of influenza, which disease was prevalent in the community at the time. The subsequent course of the disease, however, compelled me to make to those interested the somewhat humiliating confession that I had been mistaken in my diagnosis. The case proved to be one of puerperal septic cellulitis, a diagnosis which was afterwards confirmed by Dr. W. J. Mayo, who opened and drained the pelvic abscesses.

In fact, it would seem that the obstetrician who relies entirely upon clinical evidence as a means of diagnosis will surely make frequent errors in prognosis and treatment. In order to determine the exact seat and extent of an infectious process clinical observation needs to be supplemented by anatomical and pathological data.

No doubt it would be desirable if every general practitioner had the facilities and the skill necessary to make bacteriological examinations. However, it seems that up to the present time few practitioners are guided in the treatment of puerperal septic disease by the findings of the bacteriologist. Koblank concludes an article on this subject as follows: "In obstetrics bacteriologists are also at work—however, it must always be remembered that bacteriology has to do with many changeable and in part unknown factors, as virulence, immunity, disposition, etc. The inaccurate estimation of a single factor may destroy an entire calculation."

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FORCEPS AND OTHER MECHANICAL AIDS IN OBSTETRICS—USE AND ABUSE.

W. A. ROHLF, WAVERLY.

Higher civilization has made childbirth more difficult. The greater development of the brain, tending to increase the size of the foetal head. In the mothers a more highly organized nervous system with debility due to high pressure living, the demands of society and fashion, are conditions that conduce toward making childbirth more serious.

The obstetrician's art is keeping pace in assisting the waning forces of nature at this trying time. Mechanical means often being employed.

Perhaps the most important mechanical instrument in common use is the obstetrical forceps. The early history of the true obstetrical forceps dates back to the latter part of the sixteenth or early part of the seventeenth century. Its use limited to a very few, soon came into general use when the secret held for a hundred years by one family became public. The original straight forceps with a cephalic curve was modified by the addition of the pelvic curve in 1747. Except in the matter of lengths no special changes were made in the various forceps until the axis traction idea was developed by Tarnier. We now have various patterns, hundreds perhaps, with the general principles of cephalic and pelvic curves common to all and differing more or less as to length. Various devices for the application of axis traction have been devised from time to time. Any one of these properly curved and shaped instruments skillfully and properly used is practical. As we become accustomed to a certain instrument it serves our purpose best. It is my privilege here to say that I prefer Simpson's forceps for general work. An axis traction forceps can be made by the application of a simple device attachable to any of these forceps. It is needless to say that forceps should be made of material that can safely be sterilized by boiling. From William's Obstetrics, 1903, I quote: "The forceps should be used as a tractor, rotator, compressor, dilator or irritator."

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The primary function of the forceps is certainly that of traction upon the properly presenting portion of the child. This traction should be intermittent and gentle. Brute force here becomes an abuse of the use of forceps, unless the chance for severe lacerations is a secondary consideration. Primarily forceps are not used as compressors; although compression results in a degree commensurate with the amount of traction. As rotators forceps become useful in occipito-posterior positions.

As a dilator of the cervix its function is certainly very limited and inferior to several other safer and efficient methods.

As an irritator of uterine contractions it seems to me that forceps have no special advantage, except gentle traction be made after their introduction. Indications for the use of forceps. I quote again from Williams: "Strictly speaking, the termination of labor by forceps, provided it can be accomplished without too great danger, is indicated in any condition which threatens the life of the mother or child. On the part of the mother, such conditions are, eclampsia, heart lesions attended with broken compensation, acute oedema of the lungs, hemorrhage from premature separation of the placenta, intrapartum infection or exhaustion." "As regards the child, the operation may be called for by prolapse of the umbilical cord, premature separation of the placenta, undue pressure exerted upon the head, and especially by change in the rhythm of its heart beat and the escape of the meconium in vertex presentations. A foetal pulse falling below 100 or exceeding 160 to the minute, indicates that the child is in danger and will perish if not promptly delivered. In vertex presentations, the discharge of amniotic fluid tinged with meconium indicates interference with the placental circulation and imperfect oxygenation, manifesting itself by paralysis of the sphincter ani. In breech presentations on the other hand the presence of meconium is without significance, being due merely to pressure upon the child's abdomen."

This is probably a very scientific summary for indications for the use of forceps. I believe, however, that in our general practice forceps are and should be used when practical after complete dilatation of the cervix. (They should never be used unless absolutely necessary before complete dilatation). When the sec-

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ond stage of labor has continued for an hour or at most two hours, with a very slow descent of the head, forceps should be applied. Is there any need of continuing the agony of this stage? Why permit the suffering and acute struggle to continue to exhaustion? Forceps may be used to assist in overcoming a very unyielding perineum. Cannot see why forceps skillfully and carefully applied and traction properly made under these conditions should result in anything but good to both mother and child. However, we wish to deprecate the use of brute force and the untimely use of forceps for the sole purpose of saving time for the physician. I wish to be understood as believing that forceps are not used often enough, and that a greater amount of suffering could be prevented by the earlier and proper use of the obstetrical forceps. That their range of usefulness is larger and their use oftener indicated than the purely scientific or technical indications given in our text books.

In the matter of locking the forceps, great care is needed, but when certain of the presentation, and certain it is a case for forceps delivery, a little gentle manipulating of the blades first one and the other, will usually bring about the desired result. It would seem a safe notion to follow, that when the locking of the forceps is not reasonably easy of accomplishment, that one or both blades be removed and a re-examination made of the presenting part, and the reason of the difficulty discovered.

Illustrations showing the result when one blade is applied over occiput and the other over face or brow showing that blades cannot lock.

Also showing that traction would produce extension, a condition to be avoided.

It is not necessary to mention that in all forceps deliveries, perfect aseptic conditions should be brought about, the details of which are not within the province of this brief paper.

The pelvimeter, an instrument of practical value, is not as generally used as it merits. This simple device should be used in the early examination of primipara and those multipara with history of previous hard labor. Case of Mrs. R.

Besides the knowledge the physician gains, the mental effect on the patient, when assured that the measurements are satis-

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factory, certainly is good. It removes some of the uncertainty in her mind and adds confidence in her physician, so valuable at all times, absolutely desirable in cases of confinement. The confidence reposed in a physician at this time he should merit and retain.

With hospitals springing up about the state so numerously, entrance there for cases of confinement will be practical anywhere in the state. Early diagnosis of pelvic deformity will be oftener made by using the pelvimeter as a sort of routine and much can be gained for both patient and physician. The hospital treatment of patients will become more popular, especially where surgical procedures are to be expected. Pelvimetry will aid in determining the probable necessity for Caesarean section, induction of premature labor, etc., and none will deny that hospital advantages with its incubator and other conveniences will give better chances for mother and child. Let us increase the present growing hospital sentiment.

Among some of the minor aids in obstetrics we might mention the rubber pad. Various patterns are used. The Crandall pad is perhaps the best. These can be rapidly rendered sterile with lysol and boiling water. The advantages of the pad are: (1) Cleanliness as far as the bed is concerned. (2) Facilitates washing patient before and after labor. (3) Admits of perfect sterilization. (4) Compact to carry.

The obstetrical slipper, designed to allow greater voluntary use of the abdominal muscles in the second stage, are not ordinarily to be used. At this juncture the pains are usually strong enough and the woman should rather be urged to desist from voluntary efforts at expulsion if possible. The tearing of the perineum will thus be prevented. The use of the obstetrical slipper or any other method that unduly increases voluntary efforts at expulsion increase the possibilities of this laceration, which is too frequent at best.

The catheter, so commonly used during and after labor, should be sterilized by boiling in sterile water. It does not seem best to keep them in antiseptic solutions on account of irritations following their use due to these agents. A soft rubber catheter is perhaps the most preferable, boiling in sterile water the best way to sterilize. The use of a dirty catheter certainly would be an abuse capable of producing serious results.

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In this connection I wish to mention a simple and reliable method of tying the umbilical cord by means of a little device known as Kellogg's Tunis Applicator. This consists of a four-bladed sort of forceps by which a rubber band of proper size is quickly and neatly placed around the cut end of the cord. There is no danger from bleeding as sometimes happens when a string is used. The instrument and rubber bands can readily be sterilized by boiling.

Bougies, hard or soft, are perhaps the best mechanical means for the dilatation of the cervix to induce premature labor. Abuse of these would consist in their use when induction of premature labor is not pathologically indicated.

In the use of the soft bougie, the important point seems to be the high introduction between the membrane and the uterus. After twenty-four hours the bougie should be removed, cleaned and inserted on the other side of the uterus well up toward the fundus.

In this connection I mention H. F. Gau's obstetrical dilator. I quote from Peterson & Lewis Practical Medicine, series April, 1902, page 130: "H. F. Gau has invented an obstetrical dilator which is intended to supplant the use of the hands where dilatation is indicated. Among the advantages claimed is: (1) The shape of its oval dilating extremities tending to prevent lacerations of the cervix. (2) Aseptic contruction of the instrument. (3) By introducing one blade of the dilator at a time the instrument may be inserted readily in a cervix admitting an index finger. (4) The first stage of labor, especially in cases of eclampsia may be accelerated. The blades are introduced into the cervix separately and then locked." It would seem that this instrument might meet many indications and be superior over any other method as a rapid, clean and safe method of dilating the cervix.

In placenta praevia, DeLee claims the best results from the use of the colpeurynter.

Before closing these rambling remarks I wish to say that the obstetrician's hands properly prepared and skillfully used are sufficient in most cases of labor, and that neglect in the matter of their proper aseptic preparation a means of dire abuse.

To us backwoods physicians, the greatest boon and aid in our obstetrical work has been the discovery of the trained nurse.

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Section of Gynaecology.

REPORT OF CHAIRMAN OSCAR FORDYCE.

Gentlemen: It is my duty, pursuant to custom, to report the progress made during the year. This is a hard task. The field of gynaecology is so interwoven with the other branches of medicine and surgery, that there is grave danger of trespassing on other fields. In fact the gynaecologist only, like unto that ancient bird, the dodo, is practically extinct.

Gynaecology should be more than merely operative, but the fact remains it is largely operative. The work of the gynaecologist being a gradual development from tinkering with glycerine tampons, idodine and caustics, to plastic, pelvic and then abdominal surgery. Also bear this in mind, that the work of the physician often begins where that of the surgeon ends, and that as most of the members of this Society are doing more than gynaecological work, it makes them all the better qualified for this work. Hence the general progress of the art of surgery has for this branch especial interest.

The literature has been voluminous and good, both in quality and quantity. There has been nothing startling or novel, as in some of the years of recent date—nothing in the literature of the past year to compare with that remarkable and monumental work of John G. Clark, then of Johns Hopkins, now of the University of Pennsylvania, on postural drainage; nothing like the introduction of spinal anaesthesia, or the angiotribe—simply the record of good and progressively better work, and with it the introduction of very many so-called new operations, useful and useless. Charles Lamb once said that a man always took up the newspaper with expectation, and laid it down with disappointment. Hardly a journal is to be taken up but that you will find therein an account of some new operation on the uterus or its appendages, or some modification of an old one, and many of these journals, as Lamb said of the newspaper, you will lay down with disappointment.

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The mention of all of these new operations would be simply boring you. For example, the work on the round ligaments for retrodisplacements, shortening them by doubling up in front of the uterus, folding on themselves, resection and shortening of the same, approximating them in front, drawing them through an aperture made in the broad ligaments, and uniting them together, sewing the loop posterior to the uterus, severing them in front, and sewing the divided ends to the posterior surface of the uterus, fastening the round ligaments to the anterior-abdominal wall, and within the anterior wall, pulling around outside of the recti, and uniting in front subcutaneously, etc.—this work through the abdominal incision. The various modifications of the Alexander operation, such as sewing the hernial opening with the round ligaments, going after them per vaginam in various ways, with all the ingenuity that the various operators possess, all in all a great variety of procedures, which at least serve the purpose of showing what can be done, and better qualifying us for our work by the perusal thereof, by making us more resourceful, if nothing else. Many of them will be relegated to the realm of innocuous desuetude, and a few remain to perpetuate the name of the inventor. This is mentioned not with the idea of recording all that has been done during the year, but as an illustration of the activity in gynaecological work. In other lines the same activity is manifest. One of the improvements within the year—that of Dr. E. C. Dudley, I wish to call your attention. It is the matter of end to end approximation of the broad ligaments in abdominal hysterectomy, briefly mentioned in supravaginal amputations, sewing the cervical stump from side to side, instead of anteroposteriorly, as has been the custom, and the end to end approximation of the broad ligaments, wholly or partly, as well as it can be done, separating the bladder and rectum, lessening the danger of infection from either, and giving, as he claims, better support to the pelvic floor, a procedure I have not as yet tried, but which appeals to my common sense as possessing good points. I would especially call the attention to those who have not yet seen it to the anatomical work of Byron Robinson on the ureters, representing, as it does, a vast amount of research and

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patient labor, giving more information as to the anatomy and physiology of these organs than any other literature at my command. This is possessed of unusual interest to the gynaecologist, for who is there among us who does abdominal surgery who has not a sublime respect for the ureter. The operation of J. C. Webster of repairing the stretched linea alba, and consequent diastasis of the rect muscles with resulting gastrosis, while not belonging to the year is yet, I believe, a very useful operation, and judging from the lack of literature on the subject, a neglected one. I would call your attention especially to it, and ask you to keep it in mind, not that it is especially limited to the field of gynaecology, but it is not stretching a point to remind you that the father of the family is exempt from the condition, and it is a condition most apt to be found simply by the man who is looking for it. It is easily demonstrated. Simply push the flat of your hand between the recti muscles with the patient in the prone position, and have her raise her head. This is a condition direful in its results, and easily remedied, and may often-times explain to you a condition not otherwise discovered, clearing up many obscure ailments of the digestive organs with the attending neurasthenia. (In fact the diagnosis of intraperitoneal affections is undergoing a revolution, and our failures in diagnosis are too often due to haste or laziness. If you wish to make a correct diagnosis, insist on, and carry out, a correct and thorough examination).

As to treatment of cancer of the uterus, the year, I believe, leaves it just as it found it—debatable ground. I quote from the American Journal of Medical Sciences:

"Treatment of Cancer of the Uterus—Pozzi (Annales de Gyn. et d'Obstetrique, November, 1902) concludes a paper on this subject, read before the International Congress, with the following deductions: First—The surgical treatment of uterine cancer rarely results in a permanent cure, the average period of freedom from recurrence in the most favorable cases being from four to six years. Second—Hysterectomy is not justifiable in cases in which the uterus is fixed by extension of the disease to the surrounding tissues; curettement and cauterization give the best results under these conditions. Third—The importance of

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involvement of the glands has been exaggerated. Recurrence nearly always takes place in the cicatrix. Extirpation of the lymph nodes can never be complete, and seems to have no influence on recurrence, therefore the abdominal route should not be chosen with this object alone. Abdominal hysterectomy is more dangerous than vaginal, and there is greater risk of infection, hence it should be reserved for cases in which the indications are clear—large size of uterus, adhesions, narrow vagina, etc. Fifth—In early cases of uterine cancer vaginal extirpation gives excellent results, while in advanced cases palliative treatment is preferable. Sixth—Vaginal hysterectomy is then the operation of election in cases in which the uterus is movable and there is no palpable evidence of extension of the disease to the surrounding tissues, with such exceptions as have been mentioned.

"Jonnesco, in discussing this paper, takes the optimistic side of this question. He concludes that the results of the surgical treatment of uterine cancer are quite satisfactory, since life is prolonged and a radical cure is sometimes obtained. The ideal operation is one that includes complete removal of the uterus and adnexa, of the pelvic connective tissue, the vessels and lymph nodes, the iliac and lower lumbar as well as the pelvic. This cannot be accomplished by the vaginal route, which should be reserved for partial or palliative operations. Abdominal hysterectomy should be limited to cases in which a radical operation is possible, that is, at an early stage in the disease.

"Wertheim agreed with the last speaker, and reported 120 cases of complete abdominal extirpation, with a former mortality of 20 per cent., now reduced by better technique to 13 per cent. In his first series, in which over two and one-half years had elapsed since the operation, 77 per cent. of the patients were cured, as compared with 56 per cent. reported by Chrobak after vaginal hysterectomy. Careful examination of the extirpate glands in eighty cases showed that these were cancerous in forty-eight, which fully justified radical extirpation.

"The majority of the speakers favored the radical operation."

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The use of adrenolin belongs to the section of therapeutics, but to every operator it is invaluable locally for its haemostatic qualities, and as recent experiments go to prove, may be very valuable in surgical shock, when used hypodermically, and judging by the experimental work of Crile, is worthy of trial in this condition.

Whilst this report should be an impersonal one, I would briefly mention a personal experience, resulting from the use of thyroid ext. In administering it for the reduction of obesity, I found in two cases that it created a condition of amenorrhoea, restoring the menstrual flow, with no untoward symptoms.

With many good journals found on every doctor's table, and the many new books on the shelves of his library, it seems to me that the principal duty of the chairman of a section should be the preparation of a program, and that any attempt on my part to entertain you longer would deprive you of time better spent in listening to the papers and discussions.

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DISEASES OF THE FALLOPIAN TUBES.

WILTON M'CARTHY, DES MOINES.

The Fallopian tubes are situated at the upper margin of the broad ligament and extend from either cornuae of the uterus to the sides of the pelvis, and are divided into three portions: isthmus, the ampulla and the fimbriated extremity. The tube consists of three coats: the serous or external, the muscular or middle, and the mucous or internal. The external coat is a continuation of the peritoneal coat, while the inner is a continuation of the mucous coat of the uterus and is lined with columnar siliated epithelium.

The Fallopian tubes are tough and are well protected by their positions and relations. They accommodate themselves readily to the normal changes of the pregnant uterus. The tubes are occasionally cut during an abdominal section; they do not bleed freely, bleeding comes mostly from the small vessels of the investing mesosalpin. Most serious feature is the exposure of the mucous canal which may contain septic material. Ovariotomies have taught us that the healthy tube bears well all the injury inflicted by ligature of the pedicle. In diseased tubes, however, the ligature may cut through the tube, causing exposure of mucosa and suppuration.

ATROPHY AND HYPERTROPHY.

The tube shares in the atrophic process which involves the uterus after the menopause. Twisting of an ovarian pedicle may produce atrophy of the tube to such an extent as to reduce it to a thin cord. The dragging of omental adhesions may also cause stretching and atrophy of the tube. Perimetric bands, pressing on the tube, may bring about atrophy and obstruction of its lumen.

Extreme atrophy of the tube may also be caused by pressure of the pelvic wall and a large uterine fibroid. Hypertrophy of the tube is a physiologic condition of pregnancy. True hypertrophy of the tube occurs when a myoma develops in the uterus

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near the cornu and also in cases of fibroids where the tumor does not press the tube against the pelvic wall. Hypertrophy of the muscular coats occurs in some forms of salpingitis.

INFLAMMATION OF THE TUBE—SALPINGITIS.

Inflammatory processes affect the coats of the tubes and the ostium results in hydrosalpin, pyosalpin and the rarer forms of haemotosalpin. The naked eye appearances in the early stages of salpingitis are not very distinct, even when the microscope already reveals marked changes. A highly vascular appearance of the tube may be due to menstruation and a considerable amount of mucous may be seen in healthy tubes. Exuberant fimbriae are evidence of health and vigor, not of disease; the fimbriae in inflammation tend to shorten and retract.

In early salpingitis the blood vessels, at first dilated, become narrower than in health. There is no rapid desquamation of the epithelium; mucoid degeneration of the cell is frequent. In advanced cases of salpingitis the epithelium persists in certain places. The most characteristic thing is adhesion of the edges of the adjacent fimbriae. The small cell infiltration presses the swollen edges together and the epithelial surface thus in contact becomes destroyed. In the middle coat, oedema separating the muscular fibres is very frequent. The oedema is the chief factor in obstructing the ostium from within. The inflammatory infiltration may end by organizing, so as to form fibrous tissue, which makes the tube feel tough. The more advanced form of uncomplicated inflammation of the tube is called purulent salpingitis. Pyosalpin implies also closure of the tube; in purulent salpingitis the ostium is usually, but not always, closed. When pyosalpin exists, the diseased mucous surface is ultimately opened by the spreading of the walls of the obstructed tube. Thus it suffers further damage and may be entirely reduced to a surface of granulation tissue or to an abscess wall. The plicae in purulent salpingitis, reduced to tuberous elevations, are far less vascular than in health, though a few abnormally thick-walled vessels remain. The middle coat is always more or less infiltrated with small cells in purulent salpingitis. Sometimes there is actual hypertrophy of the muscular fibres, more often an increase of

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connective tissue only. General atrophy of the affected structures in the tube may, and often does, follow long standing inflammation. More frequently, the long diseased tube shows simultaneously several stages of inflammatory process. When a pyosalpin is established the pus may not press on the tubal walls with any degree of steadiness; indeed, it may occasionally escape into the uterus. In other cases the pressure may be steady but the pus degenerates into a watery fluid and the mucosa and muscular coat into more or less fibrous tissue. In consequence of the irregular course of the inflammatory process, the appearances in diseased tubes are very puzzling and have led to intricate forms of classification, not always on scientific principles.

CHANGES IN OSTIUM.

The abdominal end of the tube is not necessarily obstructed, even in chronic salpingitis. In these cases the general peritoneal cavity is protected from the pus by perimetric bands near the ostium, which, though actually open, can only pass its contents into a narrowly limited space. The ostium may be obstructed from without or from within. Obstruction from without is due to a little deposit covering the delicate fimbriae as they lie on the outer aspect of the ovary, and when the deposit is organized the ostium is firmly closed. Obstruction from within is caused by accumulation of mucous or pus and is the most important agent in the establishment of hydrosalpin and pyosalpin. It occurs in a large proportion of the cases of salpingitis. The mucous membrane and the middle coat become greatly thickened by inflammatory processes; they swell and bulge around the ostium and ultimately close over it. Owing to the anatomical character of the part, stricture of the uterine tube is impossible. A firm perimetric band may press on the outside of the tube near the uterus. More frequently the uterine end is closed in salpingitis simply by swelling of the mucous membrane.

The natural tendency of an obstructed tube is doubtless toward cure by spontaneous relief of the obstruction. The liability of the patient to repeated attacks of pelvic inflammation often prevents spontaneous cure. Closure of the uterine end by simple swelling of the mucous membrane must obviously be re-

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lieved when the sweiling subsides; it is not apt to be so permanent as obstruction of the ostium from within or from without. Temporary subsidence of the swelling of the mucosa at the uterine end fully accounts for hydrops tubae profluens. The ostium remains in these cases firmly closed, but the fluid in the tube rushes out of the uterine end and escapes externally.

TUBERCULOSIS OF THE TUBE.

The proportional frequency of tuberculosis of the tube has not been accurately determined. Statistics of authors show great discrepancies. Of all of the female genital part, the tube, no doubt, is the most frequently affected. Tuberculosis of the tubes may exist long before puberty. Also, the Fallopian tube may be the seat of primary tubercle. It is difficult to obtain evidence of the initial changes in the tubal tissues after tubercular infection. The essential primary change is a diffuse cell growth of lymphoid and epitheloid character in the plicae, which become greatly swollen. Cheesy metamorphosis of this cellular growth speedily follows, the change beginning in the nuclei of the epitheloid cells. The specific cell growth, invading the mucosa, speedily irritates surrounding tissues and salpingitis is the result. On the other hand, previous inflammation renders the tube more liable to be invaded by the tubercle bacillus. As in tubercular disease of the epididymis and testis—gonorrhoea certainly predisposes the tube to infection. When tubercular peritonitis exists, invasion of the tube from without is easy to understand. So long as the serous coat alone is involved, the disease is tuberculosis on the tube, rather than tuberculosis of the tube. The deeper coats, however, are soon invaded. The naked eye appearances are not hard to detect when the tubercular disease is advanced. The tube assumes the character seen in severe pyosalpin, its dilated cavity nearly always contains pus. The coats, greatly thickened, show abundant cheesy deposits. Free adhesions to adjacent structures are the rule. The tubercular tube becomes extremely tortuous and if unobstructed remains so.

TUBAL CALCULI.

Small, gritty collections of deposit are frequently found in inflamed tubes. The deposit is not cartilage, nor calcareous; it is essentially calculous in nature.

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MYOMA OF THE TUBE.

The tube is morphologically a part of the uterus, and its walls contain dense layers of muscular tissue. The uterus has thick walls and the development of myoma from a minute spherical body to its well known advanced form is easy to observe. With the tube it is different. The walls are thin. A tumor corresponding to the interstitial fibroid would soon spoil the tube by growing inwards and obstructing the canal, or at least rendering it too much deformed to carry on its functions. On the other hand, it may be a sub-peritoneal fibroid; in such a case the tube would be affected to a more limited extent. Most of the reported cases of myoma of the tube are pedunculated; that is, of the sub-peritoneal class.

CYSTS OF THE TUBE.

The large, irregular, yellow vulvae so often seen on the surface of the tube in cases of uterine myoma are not pure cysts but dilated lymphatics. When the adjacent tissues are divided during an operation, the lymph drains away and the vulvae disappear. The common broad ligament cyst occasionally develops above the tube or under the serous coat of the free border of the tube. The pedunculated cysts which are so frequent near the fimbriae, contain clear fluid and are lined with endothelium. The largest is the pyriform-hydatid of Morgagni. It is very apt to undergo hypertrophy when the adjacent structures are diseased. Minute, thin-walled cysts are often seen on the surface of the mucous membrane within the ostium. As to tumors, the tube may be the seat of primary papillomata, carcinoma, sarcoma, or may be secondarily involved.

DECIDNOMA MALIGNUM OF THE TUBE.

Decidnoma malignum, or malignant degeneration of relics of the foetal envelopes and appendages, is a disease which has been occasionally noted.

The cause of suppurative and inflammatory conditions of the tube is the result of the introduction of any of the pus producing micro-organisms that may find their lodgement in the tubes, and may be preceded by gonorrhoea following labor or abortion, pneumonia, diphtheria, infective diseases, extension of

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inflammation from a septic appendix, instrumental or digital examination, intra-uterine manipulations or tuberculosis.

Bacteriological examinations have revealed the presence of the gonococcus, staphylococcus, albus and aurens, streptococcus, typhoid bacillus, colon bacillus, pneumococci and the tubercle bacilli.

A purulent salpingitis is acute or chronic with the end stage, a pus tube. Catarrhal salpingitis is either acute or chronic, may be nodular or interstitial with the end stage hydrosalpinx or haematosalpinx; the distension of the tube takes place at the outer end first; the course of the distended tube is very seldom straight, it is usually convoluted and very tortuous. The position of the tube depends upon the position of the uterus and may be found at the sides or behind it. In some of the milder forms the inflammatory conditions may abate without the formation of pus, while in more serious conditions the tube will be completely distended with pus, with the possibility of the rupture of the tube or the escape of the pus through the fimbriated extremity, causing a general or localized peritonitis. There is a great difference in the appearance and consistency of the pus contained in the tube, it may be purulent with a yellowish or greenish color, streaked with blood, with or without odor, varying in consistency from a thin watery fluid to thick ropy pus.

As the inflammatory condition progresses adhesions are formed between the tube and the folds of the broad ligament, in fact, adhesion may take place between the tube and any tissue with which it may come in contact, especially with the rectum omentum.

Palliative and local treatment. Palliative treatment in the conduct of salpingitis is not productive of very marked beneficial results. Nothing short of removal of the tube will produce anything like satisfactory results. Vaginal puncture should be employed in all cases where the abscess cavity can be so drained. If the abscess is located too high to reach in the vaginal vault the abdomen can be opened and the mass pressed down so that drainage can be effected by a vaginal puncture.

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THE THERAPEUTICS OF RETRODISPLACEMENTS OF THE UTERUS.

D. C. BROCKMAN, OTTUMWA.

There is no battlefield in gynaecology that has been more frequently nor more vigorously fought over than has the question of "therapy of retrodisplacement of the uterus," and anyone who reads the current medical literature can plainly see that the end is not yet.

The very fact that over fifty different operations have been devised, discussed and mostly relegated to the bone-yard, shows that either *the* operation has not yet been discovered or what is more probable, no one operation is suitable for all cases.

No one who has given the subject any study will doubt for a minute that the latter is the true state of the case.

If more time was spent in our medical societies considering which operation is most suitable for a given case, instead of trying to convince the audience that some particular operation was suitable for all cases, more good would be accomplished; to this end I ask your forbearance for a few minutes while I outline my ideas of the groups of cases best treated by the various operations.

There is no need of us to spend our time today discussing the causes and symptoms of the trouble; any tyro can make the diagnosis and frequently the master is unable to tell the cause in a given case.

All cases of retrodisplacement may be classed as uncomplicated and complicated. In a small number of cases of displacement we find no adhesions, the uterus not much enlarged and no gross pathology in tubes or ovaries—this small group may be classed as uncomplicated; while in the great majority will be found adhesions binding the uterus to adjacent organs or tissues, the tubes and organs inflamed or possibly the organs greatly enlarged and in a state of chronic inflammation, with not infrequently a badly lacerated peritoneum and cervix. This constitutes the complicated class and in practice this class will be

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found about ten times as frequently as the uncomplicated cases.

A very superficial investigation will be sufficient to convince the student that what will cure the cases in the first group would be useless in the latter group.

I think no one will dispute the assertion that few cases can be anatomically cured without an operation, but many cases cause no discomfort and do no harm so long as the patient does not know she has a displacement, (except there is also an injury to the pelvic floor) but is never free from symptoms after she once learns she has a defect in that locality; for this reason I do not believe it is good policy to tell the average woman of her displacement that is not producing symptoms.

Many cases that are causing symptoms can be symptomatically cured by proper mechanical therapeutics, provided the patient can take care of herself. Such cases do not require an operation unless the woman is compelled to do heavy work that will aggravate the condition.

But after excluding these cases we have left on hand the majority of all cases of retrodeviation that can be remedied only by some surgical procedure—the question is, which?

In a general way there are four methods of holding the uterus in position after the displacement has been corrected.

First—By external shortening of the round ligaments, as Alexander's operation.

Second—Internal shortening of the ligaments. (Dudley or Mann).

Third—Uterine suspension. (Kelley).

Fourth—Vaginal suspension. (Pryor or Stone).

Alexander's operation should never be used except in uncomplicated cases—but given a freely movable uterus, without tumors or extensive hyperplasia—we can promise our patient a cure by repairing the perineal defect and shortening the round ligaments in the inguinal canal; but I am decidedly opposed to opening up the internal rings sufficient to do abdominal work through these openings.

The chief objection to this operation is the fact we cannot always tell when there are complications that prohibit this procedure.

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The second operation is a very popular one in many localities. It consists of, after correcting all complicating adhesions, tubal or other defects, in folding the round ligaments upon themselves and stitching them in such a way as to produce a sufficient shortening to hold the organ in position.

In the majority of cases that have resulted from peritoneal adhesions, when the abdomen must be opened to correct the various forms of pelvic pathology, the most satisfactory operation is uterine suspension according to the method advocated by Kelley. This operation if properly done, in suitable cases, will give better results than any procedure with which I am familiar and at the same time produce less trouble than any of the others. Its scope of utility is far greater than either of the other operations.

We must admit that much fault has been urged against the operation on theoretical grounds, but little from practical observation. Most of cases in which trouble followed the operation in pregnancy or labor if investigated will prove to be cases of uterine fixation instead of uterine suspension, the former a dangerous, vicious operation to be performed on any woman subject to maternity, while the latter is one of the safest.

In the old operation of fixation, the uterus was firmly fastened to the fascia and muscles of the anterior walls, while in a properly done suspension the uterus is fastened to the peritoneum alone and in time pulls out a ribbon of tissue making a new suspensory ligament which permits of free motion to the fundus as is natural. Hundreds of women having had suspension properly done have borne children without trouble.

In view of the fact that so much fault is found with the operation and in looking over the criticisms so much error is shown to exist in the minds of the critics as to how the operation should be done, I feel that it is only right to stop a moment and consider some of the destructive features of the procedure.

In the first place no attempt should be made to anchor the uterus in any manner until all adhesions have been broken up so the organ is perfectly movable, any diseased ovaries or tubes should have proper attention—then the fundus should be brought up into the incision, a needle armed with number O

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or one formaldehyde or chromicized catgut, double, should be passed through the peritoneum on the right side, into the posterior surface of the uterus just back of center, passing into the uterine tissue just deep enough to hold the thread, and cross to the left side traversing three-fourths to one inch of the posterior aspect of the organ, then out through the peritoneum on the left side. The suture is not tied until two more like ones are placed parallel to the first but below it and one-third inch apart—all three sutures are now tied and cut short—the incision is now closed according to the pleasure of the operator.

If any trouble is experienced in getting the fundus up into the incision it may be raised by an assistant with two fingers in the vagina back of the cervix and easily brought well up into position. Care should be exercised that the fundus is not sutured down against the pelvis so as to interfere with the expansion of the bladder.

We hear much fear expressed that obstruction will result from a loop of the intestine slipping back of the new ligament, but many of us have loops of intestine guyed to the partial walls but we do not fear obstruction on that account, why then in suspension cases?

I know of no better operation to offer you whenever the abdomen needs to be opened for relief of other intra-pelvic diseases in cases of retrodeviation of the uterus.

While the operations we have been discussing have almost no mortality *per se*—fatalities in these cases are always either accidental, due to faulty technique or, as is usually the case, due to the complications that must be corrected; yet occasionally we find a case that for one or another reason it is not advisable or possible to open the abdomen, we are able to correct the displacement from below, either by the plan so warmly advocated by Pryor or the still less severe procedure suggested and preached by Stone.

The former operation is simply intra-abdominal shortening of the round ligaments by an anterior vaginal section, a procedure very easily and quickly done by the big New York surgeon and as shown by his record attended by very good success.

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I have not as yet done the operation but I think I will in some suitable case that objects to external scars.

Stone, of Washington. advocates a minor extra peritoneal operation that in his hands has given good results and is absolutely devoid of danger. The trouble is, it is available only for uncomplicated cases.

It consists in making an anterior vaginal incision through which the bladder is dissected from the uterus up to the peritoneum. Then the uterus is inverted and the anterior vaginal wall sutured as high as possible upon the anterior surface of the uterus, i. e., up to the peritoneal covering of the organ, when these sutures are tied they hold the fundus forward, in fact, suspend it by the vaginal walls. The balance of the incision is closed by interrupted catgut sutures. This not only holds the uterus in place but at the same time cures the cystocle that so frequently accompanies these cases. Any additional plastic work is then done on the outlet, the cervix sutured, or amputated if necessary, before the suspension is done.

Some two years ago I was called to do a retrodeviation operation on an uncomplicated case in the country, but on my arrival I found the patient badly constipated and no preparations had been made for an abdominal operation. I declined to do it, but instead dilated and curetted a large boggy uterus, amputated a badly damaged cervix, fixed the vaginal flap far up on the surface of the uterus, repaired an extensively lacerated perineum, and was well pleased eighteen months afterwards to find I had a complete cure of her retroversion cystocle and retocle without an external scar nor opening the peritoneum.

One year ago I had a similar case that refused to have an external operation done, in whom I got very good results by this simple procedure. I am free to confess that in both of these cases after the incisions had closed up I placed pessaries which were worn for several months.

That the last operation has a limited field of usefulness I will admit, but in my first case nothing else could be done, as she refused positively to have the operation postponed or stand for an abdominal operation later on if we did the plastic work then.

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My plea is for you to suit the operation to the case and not try to make the case fit the operation you especially favor.

Analyze your cases more carefully and let the work you do be governed entirely by the indications to be met.

Discussion on the Paper of Dr. Brockman.

DR. WILTON MCCARTHY. of Des Moines.—*Mr. President:* The intra-abdominal shortening of the round ligaments for retroversion of the uterus appears very good on the surface. The mechanical portion of the operation looks all right, but practically it does not give the results that the Alexander operation does, on account of the shortening of the ligament and using material of value in so doing. The portion of the ligament that gets away and allows the uterus to slip back is the outer portion of that ligament, and you place the responsibility, as it were, on the portion that first gives way. You utilize only a portion of the ligament that has no value in doubling upon the uterus. You do away with this when you resort to the Alexander operation, because you draw through the round portion of the ligament that has lost its tone and vitality, and you put the responsibility on the firm portion of the ligament that is next to the uterus.

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RADICAL VERSUS PALLIATIVE MEASURES IN GYNAECOLOGY.

DR. VAN BUREN KNOTT, SIOUX CITY, IOWA.

This subject is chosen not so much with the idea of imparting new facts or methods, as with the hope of emphasizing the necessity of a more general application of those already understood.

It is a matter of almost daily occurrence to be consulted by women who have been suffering for years with some disorder, which is in most instances readily curable and yet for whose relief nothing but ineffectual and merely palliative efforts have been made.

Whatever may be said of gynaecology, it cannot be charged with having hidden its light under a bushel, and while its progress during the two decades just passed has been marvelous the publication of this advance has been unusually widespread and extensive.

To what then can be attributed the delay and hesitation, manifested by so many members of our profession, in employing these somewhat more radical but at the same time more satisfactory and beneficial procedures?

The factors which contribute most largely to this result are two in number. First—The failure in many cases to make a thorough, painstaking examination; this will be referred to again. Second—The widespread prevalence of a most firmly grounded superstition, namely, the "cure all" properties of the tampon.

I do not believe that any medical procedure has been so blindly and persistently followed for as many years with so little real benefit and so much of actual harm as this wholesale tamponade of women suspected of some uterine or ovarian disorder. Do not misunderstand me, I am not condemning the use of a properly medicated tampon in those few instances where it is indicated and has been proven of real benefit.

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But I do decry the wholesale and reckless use of this agent which though harmless in itself may yet be indirectly responsible for irreparable injury done the patient by postponing proper and radical treatment.

This unscientific, careless and reprehensible use of the tampon, (or might I not better say its abuse?) must be considered as a superstition handed down by tradition, but it is nevertheless quite firmly grounded.

Take away from the so-called "tinkering gynaecologist" his tampon and you at once deprive him of a large source of revenue, and his practice of its most frequently employed remedy. But of what do you deprive his patients? Is it not true that many of them have been mistreated and led blindly along for months in fancied security and hopes of complete restoration to health by the frequent employment of this agent when no such consummation by this means was possible?

To be more specific: Take for instance the case of a woman suffering with the distressing symptom-complex which accompanies retrodeviations of the uterus. It is unnecessary for me to describe these symptoms in detail, for with them you are all familiar and will freely agree that in many instances the patient is reduced to a most pitable state.

In how many cases of chronic retrodisplacement of the uterus have you known palliative treatment to effect a cure? In very few, if any, but in how many cases have you known of its being persistently kept up for years?

I have operated upon cases of this type that had been treated more or less continuously by tampons, the so-called uterine tonics, electricity, douches and the Lord knows what for twenty years, when a simple ventro-suspension and three weeks in bed would effect a complete cure.

Again, those cases of extensive laceration of the cervix with incomplete repair and the presence of a large plug of cicatricial tissue in the lower cervical segment. The patients in consequence of the pathology just described usually suffer from a chronic engorgement of the entire uterus, more or less displacement, due to its increased weight, and a most annoying train of reflex disturbances. If a patient came to us with a cinder in

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his eye which was causing him great pain and setting up serious inflammatory complications in that organ we would not be content with the application of remedies to the part, no matter how soothing they might be, until we had removed the source of the trouble. Why then in cases like the former should the cause of the disturbance be so long overlooked and neglected and the symptoms occasioned by it so diligently treated?

Why not at once repair or amputate that cervix, thus removing with the broad cicatricial plug the source of the trouble and insuring to the sufferer a certain and speedy recovery.

Now to many of you I have no doubt all this sounds very elementary and is most tiresome, yet these pictures are not imaginary.

Patients of this class are not so frequently neglected or improperly treated as they used to be and yet such instances are far too common.

Many a strong and otherwise healthy woman has been allowed to drift into a state of chronic invalidism, a total nervous wreck, with no more impetus than that furnished by a displaced uterus, or a lacerated cervix and perineum. So far as my personal experience goes the vast majority of women suffering from this so-called minor class of ailments have been treated ineffectually for a long time by the palliative and, in their cases, useless gynaecological measures. That must be my excuse if one is needed for presenting this subject for your consideration.

It must not be forgotten that the longer such pathological conditions are allowed to go unremedied, the more firmly implanted upon the individual become the deleterious influences resulting from them, and the less perfect and more prolonged the convalescence after radical treatment.

It would be impossible in the time allotted for this paper to deal exhaustively with the various conditions coming properly under this subject, and I shall attempt to illustrate the point by using a few only of the more common ones.

Now let us turn to another class of gynaecological cases in which the penalty of procrastination is even more serious than in those above considered. First in importance we must place carcinoma of the uterus. It is a well known fact that needs no

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reiteration here than if we can accomplish anything towards the cure of cancer of the uterus we can do it only by an early hysterectomy. The word early is here of vast importance, for all late operations are useless or worse than useless.

Here it is that the importance of a careful examination is invaluable. I venture the statement that there is scarcely one of you who has not at some time seen a case of cancer of the uterus which has been treated for months by some doctor who never carefully examined the patient, and told her that her symptoms were due to "change of life." It should be the inviolable rule of every practitioner to examine every woman at once who gives a history of too frequent menstruation and he should always have in mind the possibility of the existence of carcinoma regardless of the age of the patient.

Another fact must be constantly before us and that is that there is no simple ulceration of the cervix. Ulceration of the cervix uteri is either specific or malignant and no time should be lost in determining the diagnosis. To waste valuable time in such cases by treating a malignant ulceration of the uterine neck by local applications is nothing short of criminal, and yet is it not being too frequently done?

I can recall many such cases which have been so treated for periods varying from three to twelve months. Again the superstition of the tampon.

It should be remembered that a carcinoma of the fundus of the uterus may exist for some time with no appreciable symptom save possibly a slightly bloody mucopurulent discharge. In such cases a careful curettage should be made, and the scrapings examined microscopically that the exact nature of the affection may be at once determined.

I have seen such cases which have been curetted two or three times with no suspicion that a carcinoma existed and no examination of the scrapings. Think of the harm done these patients through the delay of proper operative relief, to say nothing of the stimulus given the disease by such injudicious and positively injurious treatment.

The same remarks would also apply to cases of sarcoma of the uterus.

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There are many symptoms occasioned by uterine fibroids which demand their immediate removal and the failure to appreciate which subjects the patient to unnecessary dangers.

Pronounced pressure symptoms, recurrent hemorrhages, gradual and steady growth, sloughing of a submucous fibroid, and more or less constant pain, are all indications for immediate operative relief which cannot safely be disregarded. Then, too, the possibility of fibromyomata undergoing malignant degeneration must not be forgotten.

I reported the case to this Society, three years ago, of a woman who had been treated for five years for a large and troublesome fibroid which suddenly began to grow very rapidly. I made an immediate hysterectomy, and the pathologist reported the tumor to be undergoing sarcomatous degeneration.

Ovarian cysts may be best treated by following the dictum of Kelly, who says that they are to be regarded as malignant until removed and proven otherwise. The percentage of malignancy among ovarian cysts including papillomata is relatively high, and the early clinical diagnosis between a simple and malignant cyst is impossible. When this diagnosis can be easily made the golden moment when operation would afford a cure has probably been allowed to slip by. Then again the tendency of all ovarian cysts is to steadily increase in size, and with this is associated the equally constant tendency to the formation of adhesions.

The contents of an ovarian cyst may become infected, the cyst may rupture or may be subjected at any time to torsion of the pedicle.

I have seen two cases of rupture of an ovarian cyst into the peritoneum and three of cysts with twisted pedicles. Those of cysts with extensive adhesions or suppuration of the contents are more common. Needless to say the occurrence of any of these complications renders, what would have been before the accident, a comparatively safe operation a most difficult and dangerous one. These unfortunate and positively dangerous complications may be avoided by the early and complete removal of every ovarian tumor, large enough to diagnose, in patients who present no distinct contraindications to operation.

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Too often women are allowed to carry these cysts for years because they are not causing much appreciable trouble, and seem to be growing slowly if at all.

Chronic salpingitis, from the comparatively simple forms without suppuration to the most complicated and dangerous suppurative variety, still claims yearly many victims and exacts as the penalty of neglect and insufficient, improper treatment, the payment of a price which renders the sufferer a physical bankrupt. This price is represented by years of suffering, of chronic invalidism and too often the loss of life itself.

It is a well known fact that a tube which has become so extensively inflamed as to form numerous adhesions with the surrounding viscera and whose communication with the uterus, because of this inflammatory process, is obliterated, is no longer a functionating organ and is only a source of much discomfort. That a tube of this kind which, in addition to the conditions described above, contains within its lumen pus of a greater or less degree of virulence is a constant menace to its unfortunate possessor goes without question. Can the palliative measures so frequently employed in this class of cases accomplish much? In those few fortunate cases which have seemed to make good and lasting recoveries under such treatment may we honestly claim any credit for the satisfactory result, or is it to be more properly credited to the well directed and wonderful reparative efforts of nature? Is it wise or skillful treatment on our part to stand idly by while a large pus collection in the lower pelvis, unable to escape in any other manner, ruptures into the bowel or into the bladder?

I have more than once heard the attendant felicitating himself and his patient because of such an occurence with the subsequent imperfect recovery. What was he doing which prevented that rupture from taking place into the general peritoneal cavity with death as the result? But enough. I have tried to make my point clear by employing as illustrations a few of the more common maladies which when treated vigorously and scientifically will terminate satisfactorily to patient and physician alike, but which when dealt with or managed in a half-hearted and incomplete manner greatly prejudice the life and happiness

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of the woman and redound not at all to the credit of the physician.

Gentlemen, we must not be too well satisfied with our profession and ourselves.

We cannot yet truthfully say that modern gynaecology, despite its great progress and its multitudinous resources, is ideal. Too many women are still enduring a living death. Too many homes are yearly rendered motherless from causes which were at some time distinctly curable, and so long as this is true we are not living up to our obligation and have no cause for self complacency.

Discussion on the Paper of Dr. Knott.

DR. W. A. ROHLF, of Waverley.—*Mr. President:* I do not believe that we ought to pass by this excellent paper without some discussion. I have only words of commendation for it, and I rise merely to say that I endorse and would emphasize the ideas and principles enunciated by the essayist.

DR. A. L. WRIGHT, of Carroll.—I wish to enter a protest against one suggestion offered in the paper, and that is in regard to curetting cases of suspected malignancy. I doubt very much whether it is good practice to open up avenues for extension of the disease for the purpose of confirming one's diagnosis when it can be readily made without it. It is a dangerous practice to resort to curettement in these cases of suspected malignancy, and the thing to do is to resort to a hysterectomy, and not increase the dangers. We know that the manipulation incident to the curettement of the uterus for diagnostic purposes is dangerous.

DR. KNOTT (closing the discussion).—With reference to curettement of the uterus, Dr. Wright misunderstood me a little. I wanted it understood in these cases that where curettement is resorted to in cases of suspected malignancy, it is done for the purpose of examining the scrapings. Of course, Dr. Wright can make a diagnosis in a number of these cases without curetting the uterus, because he has had a large experience. He is operating on such cases frequently. But every man who sees these cases cannot make a diagnosis without curettage and examining

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the scrapings. The average practitioner cannot do so without resorting to such a measure, and to make the statement that the average general practitioner can make an early diagnosis of carcinoma of the fundus of the uterus without a microscopical examination of some of the scrapings, I think, is a mistake, and I believe that is the very reason why a large number of cases are allowed to go on for six months, twelve months, or eighteen months before a diagnosis is made. In cases of carcinoma of the fundus, the chances of complete cure from early hysterectomy are good; they are so much better than those in cases of carcinoma of the cervix. I believe the cures are few following hysterectomy for carcinoma of the cervix uteri by any operative procedure; while exactly the opposite is true of carcinoma of the fundus of the uterus, if operation is resorted to early. When a patient comes to the office with a slightly bloody, mucopurulent discharge, who has had no pain, and is at the menopause, and this disturbance has continued for months or more, the majority of practitioners fail to recognize the importance of that chance to operate, and if anything is done they are very apt to resort to curettement. I do not believe curettement, if followed immediately by hysterectomy, say within forty-eight hours after the scrapings have been examined, will do any harm. It will not do half as much harm as allowing a woman to go six months or a year without operation. As against the tendency to let cases go too long, until the diagnosis is so evident that it can be made by anyone, the paper was written.

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EXTRA-UTERINE PREGNANCY.

D. MACRAE, JR., COUNCIL BLUFFS.

Mrs. Berg, German lady, residence Neola, Iowa, aged 40, married twelve years, never pregnant until 1900. Family and personal history negative.

August, 1900, after two months amenorrhea, with no unusual symptoms other than those of normal pregnancy, patient was seized with excruciating pains in lower abdomen.

Her family physician, Dr. Doyle of Neola, was immediately summoned and found the lady suffering as above mentioned. In addition to the pain she appeared to be in extreme shock, with rapid pulse, blanched features, restless and faint, but perfectly conscious. Bimanual examination by Dr. Doyle revealed a tumor mass in left pelvic region, uterus large, and all associated with an indefinite fluid sensation to the touch in the culdesac of Douglas.

Dr. Doyle, who is by the way a most excellent diagnostician, realizing the danger and having made a diagnosis of intra-abdominal hemorrhage, raised foot of bed, applied heat to extremities, administered ½-grain morphine and telephoned to me to come at once, "ruptured tubal pregnancy." Fortunately a train was at hand and I arrived in Neola an hour or so later. I found the lady suffering with symptoms as described above except that each were more intensified. The pulse was barely perceptible at the wrists, skin cold and clammy, patient still conscious.

Dr. Doyle having had time to have everything in readiness, no time was lost in opening the belly. Immediately upon entering the peritoneal cavity great clots of blood were expelled. At this time physiological salt solution was allowed to enter subcutaneous tissue of breasts. In passing my hand into the pelvis I at once came upon a foetus 2½ inches in length lying full in the posterior pouch of the pelvis, the umbilical cord still attached to the placenta within the tube and broad ligament. The tube, sac, placenta and all were rapidly scooped to the surface, broad

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ligament clamped off, parts removed, stumps ligated, pelvis wiped dry and belly closed without drainage. Patient was removed from the table pulseless. Later, however, under the influence of strychnine, Na. Cl. sol. heat, etc., she began to rally and from that time on recovery was uninterrupted.

About one year later Mrs. Berg again conceived, no untoward symptoms developed and the gestation pursued an apparently normal course. The idea of a second ectopic pregnancy on the opposite side never occurred to anyone, therefore no examination was made, the patient not even deeming it necessary to consult her doctor.

At the end of the full term, Mrs. B. was taken with labor pains and Dr. Doyle was called. The doctor, upon examination experienced great difficulty in finding the external os which he finally located high up in the pelvis, the cervix occupying a position near the fundus of the bladder, posterior to the symphysis pubes. The mass occupying the posterior culdesac seemed to be a part of the enlarged uterus but so thin that the vaginal mucous membrane seemed to be the only membrane between the examiner's finger and the foetus.

Pains soon ceased altogether and the doctor returned to his home very much nonplussed and instructed the husband to call him when the pains returned. Several weeks passed before Dr. Doyle was again summoned. This time the lady insisted that she had felt no life since the pains stopped. At the end of the tenth month Dr. Doyle called my father in consultation.

At this examination the same difficulty was experienced in finding the cervix. Under chloroform the neck of the uterus was found, buckled tightly up against the symphysis but could not be pulled down by any tenaculum. Dilatation was attempted, the insertion of sound tried but all to no purpose. The walls of the supposed uterus seemed too thin to invite rough manipulation.

About this time the patient developed an evening temperature of 100 to 101° F., loss of appetite, reduction in weight, etc. May 3, 1902, about eleven months after the conception or two months after the spurious labor the patient was removed to the W. C. A. Hospital. Council Bluffs, when she was again sub-

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jected to a rigid examination. So difficult was the examination that the opinion of the medical men present varied. Some thought the foetus was intra-uterus while some of us were as certain of ectopic gestation.

May 5th, 1902, I made a median incision through the belly. After the parietal peritoneum was opened, a very thick wall or sac of peritoneum presented which I must confess had more the appearance and feel of a uterine pregnancy. If any of you gentlemen have had a similar case you will appreciate the situation. After packing off the general cavity I cut boldly through this sac. A large quantity of amniotic fluid at once escaped.

The walls of the sac were now drawn partly through the wound by my father and Dr. Doyle while I rapidly extracted a fully formed macerated foetus. The placenta was extracted enmass at once without alarming hemorrhage resulting. The sac was then filled and emptied several times with very hot physiological salt solution, the sac stitched to the parietal peritoneum, packed and belly closed allowing for free drainage. No unusual hemorrhage or accident happened and the patient was removed from

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the table in good condition. The operation consumed less than thirty minutes time. Patient made an uneventful recovery and is now perfectly well and attending to her household duties.

This case was of extreme interest to me and I can find no similar one on record. The following remarks pertain only to the subject of this paper and are not to be construed as an attempt at an exhaustive article on ectopic pregnancy, but rather as a few interesting theories and facts culled from literature bearing upon the case in question.

From the study of the remarks of Clarence Webster of America, Hart of England, and my friend Palmer Findlay of Chicago, I conclude the following brief outline of interesting points:

First, that my lady was the unfortunate subject of two rare and one unusual conditions; namely: (a) Two ectopic pregnancies, one in each tube at twelve months interval; (b) one pregnancy going to full term, and (c) the first operation performed upon apparently a pulseless woman ending in recovery.

THEORIES AND FACTS.

From a careful study of this case I have concluded that each conception occurred in the ampulla of each tube and each belong to Webster's classification known as the subperitoneo-pelvic variety. To explain: Rupture of the tube may occur from the eighth to the fourteenth week or thereabout. This may occur suddenly or gradually. The lower part of the already overstretched tube having no lower wall of peritoneum becomes the point of least resistance as a rule and rupture will most often take place in this situation. The ovum most often is delivered through a small opening and slowly works its way out between the peritoneal folds of the broad ligament. This process may go on without the least disturbance to the patient. The ovum, as it increases in size, pushes its way in every direction at the expense of the peritoneal coverings of the surrounding viscera, thus the gestation sac becomes walled in by tube, peritoneum of the broad ligament, connective tissue, etc. Thus we have a living, growing foetus and placenta partly within the tube but mostly occupying the interperitoneal space of the broad liga-

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ment. This is Webster's subperitoneo-pelvic classification of ectopic pregnancy. This condition existed in both instances in my case early in the development; pregnancy No. 2 eventually pushing upwards into the abdominal cavity, and then should be classified under the head of subperitoneo-abdominal. (Webster).

The layers of the wall may become extremely thin, as a result of pressure, or may undergo a hypertrophy or thickening, due to the irritation of the growing ovum. The egg as it grows may tend to push its way in any and all directions. As it distends upwards the peritoneum of the uterus, bladder, rectum and other surrounding viscera and connective tissue may be stripped of their peritoneal coverings. Rupture of the gestation sac may occur at any time or the foetus may tend to go to full term and end in a spurious labor.

In my patient's first pregnancy, rupture did occur primarily, probably about the fourth or fifth week into the broad ligament, converting an ampulla tubal pregnacy into a subperitoneo-pelvic gestation and finally secondary rupture of the subperitoneo-pelvic pregnancy about the tenth or twelfth week.

As regards the full term gestation I am inclined to think that practically the same condition existed up to the time immediately before rupture of pregnancy No. 1, with this exception or difference, namely: In No. 1 the placenta was above the sac, in other words, was still attached to the tube, while the foetus was in the connective tissue of the broad ligament. The opposite being the case in No. 2, in this the foetus and sac were uppermost while the placenta was growing in the interperitoneal connective tissue.

This is a point of great interest and of special importance as regards the development of the ovum and foetus.

According to Hart, who by frozen sections, positively demonstrated the fact that when the placenta is below in this form of ectopic gestation, this organ is not displaced to any great extent by the growth of the ovum, but becomes grafted upon any or all of the surrounding structures, such as the bladder, uterus, pelvic connective tissue, etc. When the placenta lies uppermost in the tube a different result may be looked for.

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The upward growth of the gestation sac causes a gradual pushing up of the placenta. In Hart's full term case the placenta was displaced upwards some 10 or 11 inches and was attached to anterior abdominal wall and to the inner aspect of the stripped-off peritoneum. The pressure and displacement is accompanied by a gradual disturbance of the placental tissue owing to the blood extravasation so that the nutrition of the foetus is impaired. Such cases, therefore, Hart says, are not favorable to the full term development of the foetus.

In Mrs. B's first pregnancy the placenta was above the gestation sac, as the specimen showed at the time of operation, while in No. 2 the placenta existed below the foetus and accompanied by great thickening of the peritoneum and connective tissue of the gestation sac, caused by irritation of the growing ovum.

The extreme mal position of the uterus in pregnancy No. 2 of my case and the great difficulty experienced in manipulating the part, are explained as follows: Webster says. "Displacement is chiefly noticed in the uterus. It tends to be pushed more or less over to the side opposite to that in which the pregnancy has taken place. It may also be elevated and pushed against the anterior wall of the pelvis and lower abdomen, or it may be forced into the pelvis and lie below the gestation sac."

TERMINATION OF AMPULLA, SUBPERITONEO-PELVIC AND ABDOMINAL PREGNANCIES.

Rupture of the tube between the folds of the broad ligament may go on to full term or, if the foetus dies, may terminate in the following manner:

First—By formation of haematoma which may be slight and pass unnoticed, or severe with secondary rupture through broad ligament, or the mass may suppurate with resulting abscess formation with its train of symptoms, or the haematoma may entirely absorb and disappear without evil results.

Second—Subperitoneo-pelvic and abdominal pregnancies, especially after the fourth month when the surrounding peritoneum is dissected off from the viscera and therefore lying in almost immediate contact with the musculature of the organs and particularly the larger gut, death of the foetus is usually fol-

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lowed by abscess formation with rupture and escape of contents into the bladder, peritoneum, bowel, vagina, button, through the abdominal wall, etc., or the patient may die of sepsis before rupture occurs.

Third—Mummification, which is a condition of drying out of the foetus due to the absorption of the water from the tissues of the foetus and in the membranes and placenta as well.

Fourth—Calcification, in which lime salts predominate and may be deposited throughout the ovum or foetus and even resulting in a petrifaction or formation of a strong mass known as a lithopaedon. Any one of these last three formations may be carried for years without any great distress on the part of the owner. However, they are prone to cause irritation, resulting in abscess formation, periodic attacks of local peritonitis or finally general peritonitis.

TREATMENT.

I believe in but one line of treatment for tubal, subperitoneopelvic or abdominal pregnancies, namely, laparotomy the moment the diagnosis is made. The only exception to this rule should be, in my opinion, applied to abscess formation, where the septic material may first be evacuated at the most dependent and convenient point. Authorities differ as regards the immediate removal of the placenta in the more advanced cases when the foetus is still alive. As a rule, I believe the olden method of a secondary extraction of the placenta is the safest course to pursue and if rigid asepsis is carried out no danger need be feared.

Discussion on the Paper of Dr. Macrae.

DR. D. C. BROCKMAN, of Ottumwa.—*Mr. President:* The subject of ectopic pregnancy is a series of chapters of continued interest, and the patients are to be congratulated, as well as the doctor, on the outcome. The paper is most interesting. These cases remind me of a case I had last summer. A woman came to me with an abdominal tumor plus a mass in the pelvis. She was five months pregnant. She had all the indications of extrauterine pregnancy on the left side, with the uterus crowded to the right, and as high up as could be. The cervix was almost

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beyond reach. The tip of the cervix was up in front of the mass in the pelvis. I wish to say in regard to this case, that this woman came from a location whence five cases of extra-uterine pregnancy have come in the last five years. It is a coal mining district. We opened the abdomen in this case, attempted to deliver the extra-uterine pregnancy, but found the most intense hyperaemic adhesions I have ever seen in any intra-abdominal case. The veins were large and tortuous; the mass was pulsating; the uterus was hyperaemic; it looked as though it was constricted. I want to say I did not have the courage to take that out through an abdominal incision. If I did so, I know the patient would have died in a short time. We closed the wound. We made a vaginal section and delivered a five months' foetus. The placenta was to the right of the sac and against the uterus, which accounted for the hyperaemic condition of the uterus. We packed the sac and left it until the sixth day. Temperature rose; labor pains came on; we removed the packing and repacked less firmly, to allow abortion to take place. Hemorrhage began from the extra-uterine sac. We repacked; the labor pains came on severely; a severe uterine hemorrhage occurred; temperature went up, and the patient died that night.

If I had another case like that, I do not know of any different way to treat it, and yet I would very much rather that the other fellow would treat the case.

Dr. Crayke Priestley, of Des Moines.—The cause of extra-uterine pregnancy has been the topic of a good deal of discussion lately, and it seems that gonorrhoea has been ascribed as a very important factor in its causation. There may be something in that, judging from the statement made by Dr. Brockman of five cases of extra-uterine pregnancy occurring in a particular locality. That has certainly been our experience in Des Moines. I remember at one time there were operated in the Mercy Hospital within six months over eight cases of extra-uterine pregnancy by different men, and besides these eight cases operated in this hospital, I know of at least three others that were operated on within the same period of time in Des Moines in private houses.

The case Dr. Macrae reported is one of unusual interest,

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of great rarity, and well worthy of record. When I saw the title of his paper announced on the program, I made up my mind that I would report a case of double extra-uterine pregnancy which came under my observation about two years ago. It was a case of double tubal pregnancy, with both of the tubes ruptured, evidently of different ages.

The history of the case was that of a woman, thirty-five years of age, with one child, seventeen years of age, three miscarriages, the last one having occurred six years previously. She missed her menstrual period, felt badly, considered herself pregnant again, consulted her family physician, and was assured by him that she was not pregnant, but that the symptoms she had were those of a retrodisplacement of the uterus. This was a few days after the menstrual period had been missed. Her family physician assured her that she was not pregnant, and that if she had any pain she could assume the knee-chest posture. She went on for three weeks in this way, when, during one night, at the end of this time, she was seized with an intense pain in the right side. The pain was knife-like in character, so that it was impossible for her to move in bed. It lasted for three hours. The next day she felt very unwell, but got up, went to her physician, with the same result. Three days afterwards she took a walk of about a mile, returned home, stooped over to do some work, and was again seized with an intense pain on both sides. The second attack was accompanied by profound collapse. She was sent to the hospital that night, and the next morning was operated on, after a diagnosis had been made of ruptured tubal pregnancy. The abdomen was opened. Her condition on the operating table was extreme. She was as white as could be, practically pulseless, and absolutely the most unfavorable case on which to begin an operation I ever saw. The abdomen was found filled with an enormous quantity of blood, which was scooped out. I have forgotten how the tube on one side lay. I have some photographs here which I will pass around. The smaller tube was the first one brought up, and from this tube the most active hemorrhage was occurring, the blood was pouring out through a small opening as rapidly as it could. Hemorrhage was profuse. The tube was tied off and

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removed, the blood mopped out, and the other side investigated, when the other tube was found over here (indicating), ruptured, and containing a small sac, which I show you. This tube was not bleeding at the time, and probably the pregnancy in this tube occurred at its outer extremity, and undoubtedly the intense pain which the woman had for three hours three days previously was due to rupture of this tube. There was a tubal abortion into the abdominal cavity. The hemorrhage was not profuse; the pain was doubtless due to rupture and to expulsion of the contents of the sac into the abdominal cavity.

I consider this case unique, and expect to make an extensive report of it. But within the last two weeks I have seen a case reported in which there was an exactly similar condition. The case has been reported to the March meeting of the Berlin Medical Society, and a report of it published in the Berliner Klinische Wochenschrift on the 23rd of March. This makes two cases to my knowledge that are similar in every respect. I will pass around this photograph.

DR. VAN BUREN KNOTT, of Sioux City.—The case cited by Dr. Brockman, as well as a good many other cases that are constantly met with, cause us to wonder exactly what is the best way to handle these cases of ectopic gestation. Recently before a medical society I heard a gentleman of great experience say that in cases of tubal rupture, with hemorrhage, it would be advisable to wait, to do nothing, unless the clot showed symptoms of infection, or else hemorrhage was continuing in a manner to jeopardize the patient's life. In such cases this gentleman stated that the proper thing to do would be to watch them until it was safe to operate. I am not referring now to the intra-abdominal cases, but to those cases of ectopic pregnancy in which the rupture occurs between the folds of the broad ligament. Shortly after the meeting of that society a woman was sent to me with a ruptured tubal pregnancy on the left side in the broad ligament between the peritoneal folds. I watched the case for a week. The pulse and temperature ran up; pain increased somewhat; there were active symptoms of hemorrhage, and the day after this she went into collapse. When I saw the patient in the afternoon of that day, her condition was so serious,

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that it was questionable in my mind wether any operative intervention would save her life. It became evident that she was bleeding to death and suffering from infection. On opening the abdomen, I found hemorrhage had taken place into the left broad ligament, making a wide and rather extensive tear, which doubtless happened on the morning the operation was done. It was with difficulty that hemorrhage was controlled. Her temperature was 104° at the time. It was evident the contents of the hematocele had become infected two or three days before. Hemorrhage was controlled by ligating the broad ligament; stimulation was resorted to, but the patient died twelve or fifteen hours later.

At this same meeting to which I have referred, in cases of ruptured tubal pregnancy between the peritoneal folds, the vaginal operation was advocated in preference to a laparotomy. These statements were made by men of great experience and of high standing as surgeons.

In the case I have just described, it would be absolutely impossible to have controlled hemorrhage, or to have done anything by the vaginal operation, and I am inclined to think that it is better in most of these cases to operate through an abdominal incision. It is much safer for the patient, and better for the surgeon than the vaginal operation, unless the mass presents low in the pelvis, and the bleeding points can be controlled from below. But this freqeuntly cannot be done.

Dr. Macrae (closing the discussion).—I have not much to say in regard to the cause of ectopic pregnancy. I did not go into that phase of the subject, because it is largely theoretical; but since Dr. Priestley mentions gonorrhoea as a cause, and there are so many cases of gonorrhoea and ectopic pregnancies in Des Moines, I am inclined to think that some importance might be attached to it as a causal factor. (Laughter).

With reference to the case reported by Dr. Brockman, I am getting so now that I do not like to tell what I would have done in a given case, because it may seem easy enough, but when you get into a mess you sometimes wish you were somebody else.

I agree with Dr Knott that the abdominal method of hand-

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ling these cases is preferable to a vaginal incision, because we can see what we are doing.

So far as drainage is concerned, it is not indicated in any of these cases except where we have sepsis, and then drainage may be instituted. However, in the case cited by Dr. Brockman, it seems to me, in the majority of cases of pregnancy advanced to the fifth month, where we have a living foetus to deal with, the sac can be brought up and stitched to the peritoneum.

Relative to the frequency of haematoma, one-half of the authorities favor operating on all cases, while the other half advise letting them alone until the immediate danger of shock and hemorrhage has passed off, hoping that absorption will take place.

Dr. Priestley's case was very interesting, and I hope the details of it will be given to the Society at some future meeting.

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THE MANAGEMENT OF CERTAIN GYNAECOLOGICAL NEUROSES.

C. O. SONES, PANORA, IOWA.

PROLOGUE.—The field of the ovarian neuroses, as it is to be considered in this paper, and as it presents itself to us in every day life, includes in a general way those cases of neurasthenia or nerve exhaustion, cases of reflex nervous symptoms, ovarian neuralgia, ovarian dysmenorrhoea, hystero-epilepsy, and not a few cases of insanity, which coexist, are a cause of, or a sequel of pelvic symptoms, usually most marked at the menstrual period. In most of these cases there is the nearly ever-present headache and backache, the never-relieved tired feeling, the inability to follow consecutively any well defined line of effort, the alternations of preternatural vivacity and despondency, the uninvited, unwelcome, nagging, life destroying, inexplicable nervous reflex—in fine, the symptom-complex or hysteria in some of its forms.

If at some inopportune moment when these nerve symptoms are on, some kind friend sympathizingly suggests pelvic disease, an active imagination can easily assent that there is probably the seat of the trouble, and when these symptoms are intensified at the mentrual period as they almost invariably are, the suspicion becomes a certainty and recourse is had to the intra-uterine application, curettement or some of the heroic pelvic operations. If it happens that the pelvic symptoms first appeared soon after marriage or following miscarriage, there is an additional reason for expecting relief only after special effort has been addressed to these organs. And, indeed, when one recalls that many such case prior to menstruation for from a day to a week experiences progressively an approaching nerve storm from which they are well nigh if not quite insane with pain and that the recession of the storm continues for from a few days to the time of the next approaching storm there is little wonder that these wretched people are willing to assent to anything

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which is directed to these ever suspicioned and ever offending organs.

THE ARGUMENT.—As most of us can bear witness, few patients suffer more than do these or for a longer time, for no class of cases is so difficult of management satisfactorily. This follows logically from the necessary fact that each case is a law unto itself. There is no universal dictum. The personal equation is the sum of the whole matter. That is to say, the diagnosis of each individual case as it relates not only to present conditions but to etiology is the one only correct dictum conceivable. I say this after no little reflection and painstaking review of my own work and after listening to conscientious discussions of the subject by candid men. Not long ago it was my pleasure to hear one phase of this subject, that of hystero-epilepsy and insanity, considered by a man well regarded in medical circles, who maintained that every such case with marked exacerbations at the menstrual period should have a complete ablation of the tubes and ovaries. Seriously, I can not feel that this is correct. That there are cases in which complete oophoro-salpingectomy is the proper thing to do goes without saying in a company like this, but I do believe they are comparatively few. There are four propositions which are justified by the facts.

First—There are cases presenting all of these nervous phenomena and not infrequently phenomena referable to derangement of the pelvic organs, in which there is no pathology of these organs to be found.

Second—There are cases in which abundant pathology exists but without abnormal nervous symptoms.

Third—There are cases in which nervous symptoms and pathology of the pelvic organs coexist but entirely independent of each other.

Fourth—There are cases in which nervous symptoms and pathology coexist and are rationally related.

If none but general nerve symptoms appear, logically the case is to be considered strictly from the point of view of the neurologist. But what shall be done with the headache and backache, the ovaralgia and dysmenorrhoea, the leucorrhoea and the feeling of weight and bearing down in the pelvis, the con-

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vulsions and the mental disturbances that come on only at menstruation? "Aye there's the rub." The diagnosis is up to us. But this is not always easy. To illustrate: Some years ago I had a neurasthenic young woman, to whose general nerve symptoms were added the full complement of pelvic symptoms mentioned above. I do not suppose that the president of this Society or the chairman of this section, have either of them ever made a mistake in diagnosis in a case of this kind but I am sorry to confess I have. I gave my patient nutritive tonic drugs, pushed them hard and for a long time but she failed to recover. I believed her trouble to be primarily in the pelvic organs, and that her treatment should be there. This she declined. Later she went to college, but after two months returned home apparently worse broken down than ever. After a year of persistent drugging and exercise in the open air she was able to return to college and take one study, to which was added the physical culture work required by the college. By the end of that year under the tonic effect of drugs and physical culture work required she was symptomatically well both as to her general nerve and her pelvic symptoms. I do not care to say that the medicines she took did her no good, but the "coup de maitre" was her physical culture work. By some mysterious nutritional process this work strengthened her nerve centers, her sexual centers, her digestive and cardiac centers. The throne of the will and of cerebration were strengthened, till she seemed a physically perfect woman. Mr. Chairman, those menstrual manifestations she had been having were something awful. She has had seances of which she has no memory. The memory of the regular return of the molimen for those years is to her one horrible nightmare. But she got well. She continues her physical exercises and continues well. My error in diagnosis came about by not sufficiently examining and studying the case, as it relates to her previous history and her heredity. She had always been a nervous girl. The family history was that of nervous people whose mode of life was nervous. This girl's heart was nervous, she also had trouble with the bladder and there were disorders of digestion. An examination of her pelvic viscera was not allowed, so nothing is known of their anatomical condition.

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The post-recovery diagnosis in this case turns on the history and treatment, as a case, pure and simple, of hysteria, with the pelvic symptoms as entirely secondary, and though they cried loudly that there was gynaecic trouble the case came to complete recovery without other than treatment for weak nerve centers.

The case cited above has been a lesson to me of the importance of a correct diagnosis, and years of work since then has convinced me that strengthening the nerve centers by means indicated in each particular individual, reaches successful results much more frequently than treatment of the genital organs locally. It can not be other than disappointing to treat such cases locally except the trouble be primarily in the pelvis. If there are anatomical lesions in the pelvis with resulting damage to nerves, the fact that the woman is hysterical or insane, should not, for any reason known to me, be a bar to relief in radical operation or conservative method according to indications—The nerves to be taken care of as a secondary disease. To illustrate: A woman came to my office after years of complaint from nervous and gynaecic symptoms, a careful examination of her history and her present condition showed abundant reason for making a diagnosis of pelvic disease with resulting damage to nerves, she had had treatment in plenty for her pelvic conditions but the nerve side had been entirely ignored, this latter reacting unfavorably on the primary lesions, relapses never failed to occur. By coincidently caring for both she recovered. I have had no personal experience in caring for the pelvic conditions with neglect of the nerve conditions, but I believe I am safe in saying that such a course will usually fail from the generally accepted concession that cases of hysteria dependent entirely on lesions of the pelvic viscera are rare, though with unhesitating frankness it must conceded that such a relation can and sometimes really does exist, in which event the treatment must be pelvis first, nerve second. When, however, the two conditions coexist, but independently, they should be managed independently as should a patient who has coincidently toothache and ingrowing toenails or the for a-long-time-misunderstood typho-malarial fever.

So far forth as concerns treatment by any special method

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it must be stated in all sincerity that that is entirely a matter of nutrition. The specific expedients employed must be as varied as were the etiological factors which operated to produce the conditions to be corrected. This leads naturally to the consideration of prophylaxis which is the logical corollary of etiology. If the circumstances which lead up to a certain condition are known the problem of diagnosis so far as concerns etiology is greatly simplified. The one thing which has placed modern therapeutics on such high vantage ground as compared with the therapeutics of a generation ago is the scientific etiological knowledge of today. Some young ladies one day asked the venerable Dr. Oliver Wendell Holmes, for a rule by which they might themselves become octogenarians, his answer was that they must first have grandfathers and grandmothers who are octogenarians.

Everywhere it is recognized that prophylaxis is the crowning glory of practical medicine. The girl is best treated a generation or more before she is born; therefore it behooves us to place such influences about the prospective mother and the young girl during her early school and social life, which will endow her with the initial nerve energy required to meet the demands of the modern strenuous life of the best type of useful woman. What must be the inevitable fortune of a girl who was born a nervous bankrupt and who in the fourth grade in her school work and thereafter has to spend from one to four hours each evening with her books in order to meet public school requirements if she is to successfully meet college requirements, which she must do if she is to shine in social life in after years? Every force element her nerve centers can produce so used in meeting the demands of school and social life that her body nutrition and the nutrition of the nerve centers themselves have barely enough energy left for their own use to keep her out of the grave. This is not as it should be. The nutrition of the young girl should be maintained. Indeed it must be maintained while the ovaries are yet inactive that when ovultion does occur its requirements can be met without convulsing her entire organization. The boy has football and other out-of-door means of developing and maintaining a strong body, but the most heroic thing his sister

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dare do is to sit in the amphitheater and wave her handkerchief when he does some winning act. It is immaterial whether the energizing agent be iron or arsenic or maltine or cod liver oil, or the energy to be had from God's free air and sunlight if only it be gotten and assimilated. Not many people but eat enough and rich enough food to meet all reasonable demands, but the one weak link is that of assimilation.

When the physiological chemist has worked out the facts of physiological synthesis and analysis so that tissue regeneration with its subsequent breaking down and elimination are understood it will be known why systematic physical exercises in the open air or a trip to the mountains or on the sea do such wonders when ordinary drug treatment has so signally failed.

CONCLUSION.—To briefly conclude, the cases discussed are essentially hysterical. In the large majority of instances, have pelvic trouble, either imaginary or as a sequel of nerve disease, In comparatively few cases is the hysteria dependent on pelvic disease. Successful management requires correct diagnosis not only of present conditions but previous personal and family history. Correct knowledge of primary and of secondary lesions enable treatment to be addressed to the faulty part first, the sympathizing part second. Radical operation, though rarely required, should be promptly and thoroughly done, when causative pathology does exist. Outside of operative and moral procedures the treatment is essentially nutritive. Drugs are useful sometimes, life in the open air and sun always. Systematic physical culture exercises scientifically directed are probably the most useful expedients at hand for present treatment and from considerations of prophylaxis, and if employed in early life and generally, there should not be the pressing need for the men's club, the divorce court should not be so popular; and if the old orthodoxy is to be credited, there should not be the large number of men taking permanent residence in that supra torrid clime where the fuel king has a monopoly on sulphur.

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DECEASED MEMBERS.

*J. C. Hughes, M. D., Keokuk,
Died, 1881.

R. J. Farquharson, M. D., Des Moines,
Died, 1884.

*Those marked with a (*) were ex-presidents of the Society.

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*S. B. Chase, M. D., Osage,
Died, 1891.

*W. F. Peck, M. D., Davenport,
Died, 1892.

J. B. Wilson, M. D., Creston,
Died, 1892.

*Henry Ristine, M. D., Cedar Rapids,
Died, 1893.

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C. H. Rawson, M. D., Des Moines,
Died, 1884.

H. L. Whitman, M. D., Des Moines,
Died, 1885.

R. J. McNutt, A. M., M. D., Des Moines,
Died, 1888.

A. J. Crawford, M. D., Des Moines,
Died, 1888.

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C. H. Pinney, M. D., Council Bluffs,
Died, 1894.

A. J. Hobart, M. D., Clinton,
Died, 1895.

F. M. Everett, M. D., Corydon,
Died, 1895.

Irving W. Smith, M. D., Ames,
Died, 1895.

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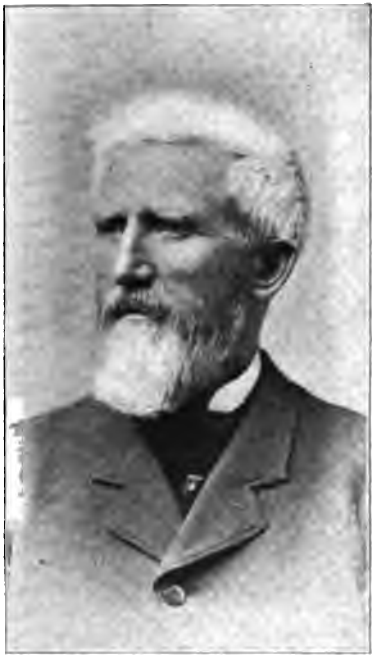

Henry Clay Bulls, M. D., Decorah,
Died. 1897.

W. O. Richards, M. D., Waterloo,
Died, 1898.

J. A. Sherman, M. D., Cherokee,
Died, 1899.

J. H. Kersey, M D., Stuart,
Died, 1899.

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Dr. C. G. Lewis, Ottumwa,
Died, 1900.

Dr. A. C. Bergen, Sioux City,
Died, 1900.

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IN MEMORIAM.

1850-1903.

The following is a list of deceased members of the Iowa State Medical Society, from its birth in 1850 to the present time in 1903, which has been compiled with much difficulty, and not without the valuable assistance of members all over the state, for which the secretary, on behalf of our Society, sincerely returns thanks. The records of dates have been hard to get, and, no doubt, there are some errors, and the secretary will consider it a special favor if anyone notices any omisions or mistakes, if he will supply him with the information at his earliest convenience, which will be added to the list in our 1904 printed Transactions.

The following list has been arranged in this order: Name, address, college, admitted, died, age.

Adams, J. W., Des Moines, Rush Medical	1899	1901	60
Applegate, A. J., Indianola, P. & S., Keokuk	1894	1895	63
Ady, A., West Liberty, Starling Med	1859	1893	65
Alleman, L. J., Boone, Univ. of N. Y	1872	1888	47
Boucher, J. H., Iowa City			
Brainard, D. S., Staceyville, Rush Med	1884	1894	
Bagley, D. S., Des Moines, Univ. of Med	1890	1894	40
Baxter, W. H., Muscatine, P. & S., Keokuk	1870	1887	59
Bergen, A. C., Sioux City, Long Island	1891	1900	51
Bosbyshell, C. B., Glenwood, Jefferson Med	1877	1900	67
Brubaker, I. P., Des Moines, Jefferson Med	1884	1893	38
Brown, Caleb, Sac City, P. & S., Keokuk	1882	1899	49
Vermont Med			
Bulis, H. C., Decorah, Jefferson Med	1854	1897	66
Butler, M. S., Cherokee, S. U. of Iowa	1894	1895	64
Butler, L. L., Muscatine, S. U. of Iowa	1876	1877	28
Bixby, S. N., Strawberry Pt., P. & S., Keokuk	1879	1885	
Cantwell, A. W., Davenport, Univ. of Mich	1884	1899	58

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Chase, S. B., Osage, P. & S., Keokuk.....	1876	1891	70
Cleaver, H. T., Keokuk, Chicago Med.....	1851	1888.	66
Crawford, A. J., Des Moines, P. & S., Keokuk..	1886	1888	
Curtis, H. N., Decorah, Rush Medical.....	1876	1890	
Davis, C. W., Indianola, Rush Medical.....	1869	1881	54
P. & S., Chicago....			
Densmore, D. T., Jamaica, S. U. of Iowa.....	1887	1888	28
De Tar, David N., Boone, Univ. of Mich.....	1884	1900	48
Drumeler, C. M., Panoca, St. Louis Med.....	1882	1899	49
Everett, F. M.. Corydon, P. & S., Keokuk.....	1864	1895	54
Failor, Benjamin M., Newton, Jefferson Med..	1886		70
Fitch, L. P., Charles City, P. & S., N. Y.....	1873	1889	53
Farquharson, R. J., Des Moines, Univ. of Tenn.	1881	1884	60
Gray, D. W., Talleyrand, P. & S., Keokuk....	1882	1884	
Groves, A. J., Creston, S. U. of Iowa.....	1891	1899	33
Gibbon, W. H., Chariton, Jefferson, Phil.....	1857	1895	64
Gustine, J. W., Carroll City, Univ. of Penn....	1881	1886	
Guyton, B. A., Sioux City, Univ. of Md.....	1879	1886	42
Hammond, S. F., Fairfield, Rush Medical.....	1884	1887	
Hart, H. W., Council Bluffs, Med. Col. N. Y...	1883	1886	
Henry, G. R., Burlington, Univ. of Ky.....	1879	1885	57
Hess, Elizabeth, Iowa City, S. U. of Iowa.....	1874	1898	53
Hillis, D. B., Keokuk, St. Louis Medical.....	1878	1900	75
Rush Medical.....			
Hinsey, J. C., Ottumwa, Univ. of Penn.....	1859	1892	63
Hobart, A. J., Clinton, Univ. of Mich.....	1857	1895	67
House, J. G., Independence, Columbia Med....	1869	1880	64
Hubbard, G. F., Polk City, Dartmouth.....	1874	1877	36
Huff, S. W., Sigourney, Rush Medical.....	1876	1881	
Hughes, J. C., Keokuk, Univ. of Md.....	1858	1881	61
Huntsman, H. C., Oskaloosa, Univ of Mich....	1871		
Harsh, M., Marne, P. & S., Chicago.....	1886	1891	41
Ingels, John B., Meriden, Bellevue.....	1878	1895	43
Jones, George Nelson, Burlington, McGill Univ.	1893	1900	48
Irish, Della S., Davenport, Women's Med.....	1875	1878	35
Kersey, J. H., Stewart, Bellevue.....	1897	1899	59
Lathrop, C. H., Lyons, Univ. of N. Y.....	1868	1892	54
Ohio Medical.....			

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Leonard, W. L., Winterset, Jefferson Med.....	1875	1893	71
Lewis, C. G., Ottumwa, P. & S., Keokuk.....	1885	1900	68
Mauran, A. J., Creston, P. & S., N. Y.....	1895	1899	68
Maxwell, A. S., Los Angeles, Cleveland Med...	1858	1884	66
McKune, A. B., Council Bluffs, Rush Med.....	1875	1883	
McNanary, S. A., Danbury, S. U. of Iowa.....	1885	1888	
McNutt, R. J., Des Moines, Jefferson Med.....	1883	1888	70
Middleton, W. D., Davenport, Bellevue Med...	1870	1902	57
Moffitt, R. H., Chicago, N. W. Univ.....	1894	1897	
Moore, C. D., Des Moines, Baltimore Med.....	1886	1889	32
Morgan, A. W., Dewitt, P. & S., Keokuk.....	1870	1893	58
Nicols, W. H., Rockford, S. U. of Iowa.....	1882	1886	41
Nicolsen, W. G., Fort Dodge, P. & S., Des M..	1886	1892	58
Noel, J. A., Dallas County, Missouri Med.....		1897	45
Osborne, Henry, C'ncil Bl'ffs, P. & S., Keokuk.	1875	1880	50
Overholt, Frank, Des Moines, Bellevue.....	1889	1896	30
O'Brien, Chas. D., Ackley, Rush Medical.....	1892	1895	
Pinney, Chas. H., Council Bluffs, Univ. of Mich.	1886	1894	51
Parker, I. W., Mt. Pleasant, Bellevue.....	1891	1893	
Page, H. R., Des Moines, P. & S., Keokuk....	1874	1892	
Peck, W. F., Davenport, Bellevue.....	1869	1892	
Pierce, S. N., Cedar Falls, Vermont Med.....	1878	1900	
Pipino, W. C., Des Moines, Baltimore Med....	1888	1896	46
Plumb, E. B., Ames, Chicago Med.....	1886	1893	35
Price, R. W., Iowa City, Jefferson.....	1868	1880	
Quirk, W. F., Alta, Rush Medical.....	1887	1889	37
Ranney, Mark, Mt. Pleasant, Vt. Medical.....	1876	1882	55
Rawson, A. A., Corning, Rush Med.....	1880	1900	69
Rawson, Chas. H., Des Moines, P. & S., N. Y..	1868	1884	56
Reeder, Geo., Muscatine, Paris, France.....		1857	40
Richards, W. O., Waterloo, Univ. of Mich.....	1888	1898	78
Ristine Henry, Cedar Rapids, Ohio Med.....	1851	1893	75
Rosseau, W. H., Washington, P. & S., Keokuk.		1883	66
Robertson, W. S., Muscatine, Jefferson Med...	1861	1881	55
Robertson, M. J., Muscatine, Rush Medical....	1870	1888	
Robertson, J. C., Council Bluffs, S. U. of Iowa..	1877	1899	54
Scofield, D., Washington, Albany Med.....	1875	1893	58
Sherman, J. A., Cherokee, C. M. C.....	1896	1899	53

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Smith, W. H., Glenwood, Chicago Med.....	1882	1882	38
Stitzel, Geo., Nevada, Penn. Medical.....	1892	1894	65
Skinner, Wm., Anamosa, Carlton, Vt.....	1877	1893	
Staples, G. W., Dubuque, Bellevue.....	1879	1895	
Sill, H. W., Strawberry Pt., P. & S., Keokuk...	1875	1892	
Smith, J. W., Ames, Jefferson Med.....	1887	1895	44
Smith, I. W., Charles City, Jefferson, Phila....	1875	1895	44
Stoner, E. C., Des Moines, P. & S., Keokuk....	1890	1901	
Thomas, F. S., Council Bluffs, P. & S., Keokuk.	1882	1899	54
Thrall, S. B., Ottumwa, Univ. N. Y. City.....	1859	1888	56
Todd, W. A., Chariton, Indiana Med.....		1897	59
Tulloss, N. H., Iowa City, Iowa State Univ....	1880	1882	56
Van Werden, H. C., Leon, P. & S., Keokuk....	1878	1895	40
Woods, P. M., Fairfield, Rush Medical.....	1885	1886	65
White, J. F., Council Bluffs, Ind. Medical.....	1886	1890	
Wright, J. A., Danville, Univ. Louisiana.....	1880	1882	38
Wyman, R. H., Keokuk, Univ. of Penn.....	1878	1881	64
Warne, Geo., Independence, P. & S., Keokuk...	1875	1894	70
Wilson, J. B., Creston, Missouri Med.....	1882	1892	56
Whitman, H. L., Des Moines, Bellevue.....		1885	70
Wray, J. H., Winterset, Jefferson Med.....	1876	1896	43

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LIST OF PERMANENT MEMBERS, 1903-1904.

OFFICERS OF THE SOCIETY.

President, J. A. SCROGGS, Keokuk.
First Vice-President, D. MACRAE, JR., Council Bluffs.
Second Vice-President, D. M. WICK, Cedar Falls.
Secretary, V. L. TREYNOR, Council Bluffs.
Assistant Secretary, F. A. ELY, Des Moines.
Treasurer, W. B. SMALL, Waterloo.

ROLL OF MEMBERS.

The following list is arranged: first, date joined; second, name; third, address; fourth, college; fifth, date of graduation.

1899 Ainsworth, E. A., West Union, Col. M. & S.....1874
1902 *Albert, Henry, Iowa City, C. of M., U. of I.....1902
1900 Aldrich, J. F., Murray, Rush.....1897
1901 Allen, C. B., Morning Sun, P. & S., Keokuk.....1881
1896 Allen, M. L., Tama, P. & S., Chicago.....1893
1900 Allen, Wm. L., Davenport, S. U. I.....1881
1894 *Amos, A. R., Des Moines, Rush Medical.....1882
1886 Anderson, A. A., Des Moines, Rush Medical.....1882
1897 *Anderson, A., Estherville, S. U. of Iowa.....1890
1901 Applegate, C. F., Clarinda, Bellevue.....1890
1895 Ashby, A. A., Red Oak, Rush Medical.....1883
1899 Augustine, J. L., Ladora, S. U. I.....1893
1903 Bailey, H., Charles City, Rush.....1897
1878 Baker, E. L., Indianola, Louisville Medical.....1873
1897 Baker, J. W. H., Davenport, Dartmouth.....1843
1894 *Bailey, S., Mt. Ayr, Rush Medical.....1879
1902 Bamford, E. E., Centerville, Rush Medical.....1893
1903 Banning, G. W., Davenport, P. & S., N. Y.....1895
1902 *Bannister, Murdoch, Ottumwa, Univ. of Penn.....1894
1902 Bassingham, O. N., Ringsted, S. U. of Iowa.....1898
1902 Bare, E. A., Superior, C. P. & S., Keokuk.....1897
1903 Barewald, C. L., Buffalo, S. U. I.....1891

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1894 Barfoot, A. F., Decorah, S. U. of Iowa.....1886
Jefferson Medical.....1887
1891 Barnes, H. E. W., Creston, S. U. of Iowa.....1873
1897 Barret, Albert M., Independence, S. U. of Iowa.....1895
1902 Barry, P. J., Auburn, Univ. of Iowa.....1891
1902 Barstow, J. M., Council Bluffs, Keokuk, Iowa.....1880
Bellevue Hospital, N. Y..1884
1900 Bascom, R. W., Ardmore, Ind. Terr.....
1898 Barthel, O. H., Pocahontas, Rush Medical.....1885
1891 Beam, W. W., Rolfe, S. U. of Iowa.....1886
1896 Beane, A. A., What Cheer, S. U. of Iowa.....1891
1892 Beane, J. V., Fairfield, Bellevue.....1868
1890 Beatty, W., Dunlap, Univ. of Canada.....1880
1894 Beck, J. W., Des Moines, S. U. of Iowa.....1881
1875 Beggs, Geo. W., Sioux City, Rush Medical.....1862
1896 Belt, A. L., Gilmore City, S. U. of Iowa.....1890
1901 Beveridge, T. F., Muscatine, Kentucky Med.....1891
1899 Berner, W. F., Merrill, Northwestern Univ.....1897
1902 Besore, W. M., Macedonia, S. U. I.....1898
1902 Besser, E. F., Newton, P. & S., Chicago.....1900
1875 Bice, D. C., Des Moines, S. U. of Iowa.....1875
1895 *Bierring, W. L., Iowa City, S. U. of Iowa.....1895
1886 Bigelow, I. S., Dubuque, Rush Medical.....1881
1891 Biller, J. G., Cherokee, Detroit Medical.....1884
1897 Bisgard, James, Harlan, Omaha Med. Col.....1894
1896 Bliss, C. S., Luverne, Univ. of Vermont.....1885
1901 Bloodgood, Chas., Clinton, Rush Med.....1881
1903 Boes, N. F., Davenport, Munich, Ger.....1895
1902 Boice, C. A., Washington, Univ. of Illinois.....1900
1897 *Bond, L. L., Denison, Rush Medical.....1870
1896 Boody, Geo., Clarinda, Chicago Med:.....1891
1871 *Bowen, A. B., Maquoketa, Albany Medical.....1868
1897 Bowen, Will, Fort Dodge, S. U. of Iowa.....1895
1899 *Bowen, Chas. P., Centerville, Bellevue Hos. Col....1892
1901 Bowen, D. H., Waukon, Rush Med.....1876
1887 Bower, E. L., Guthrie Center, Univ. of Mich.....1886
1902 Bowles, Fred, Ottumwa, K. M. C., C. P. & S.....1901
1903 Bowmen, A. W., Davenport, Rush.....1878

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1897	*Bowman, E. S., Davenport, S. U. of Iowa	1893
1896	Boyd, C. E., Newton, Univ. of Wooster	1892
	Baltimore Medical	1892
1887	Bradley, C. C., Manchester, Bellevue	1867
1899	*Bradley, W. E., Estherville, Rush Med. Col	1892
1891	Branson, Laura H., Iowa City, S. U. of Iowa	1885
1903	Bratt, J. F., Doon, Drake Univ	1897
1901	Braunlich, H. W., Davenport, Univ. of N. Y	1883
1897	Breene, F. T., Iowa City, S. U. of Iowa	1893
1901	*Brewer, L. S., Quinby, S. U. I	1896
1902	Bridge, B. D., Albert City, Queen's Univ., Canada	1900
1884	*Brockman, D. C., Ottumwa, S. U. of Iowa	1878
1902	Brooks, J. M., Newell, P. & S., Chicago	1883
1882	Brookings, D. J., Woodward, Rush Medical	1869
1902	Brown, C. F., Centerville, P. & S., Keokuk	1890
1899	Brown, E. N., Marengo, S. U. I	1888
1897	Brown, F. E., Primghar, Rush, Chicago	1891
1899	Brown, J. A., Zearing, S. U. I	1876
1902	Bryan, A. T., Forest City, Rush Medical	1882
1895	Bryant, C. H., Corning, S. U. of Iowa	1891
1899	Buchanan, R. E., Independence, Rush Med. Col	1883
1900	Bufkin, C. W., Runnels, I. C. P. & S	1898
1894	*Bundy, W. C., Aurelia, P. N. S., Chicago	1885
1902	*Burge, A. J., Iowa City, S. U. of Iowa	1900
1903	Burlingame, J. H., Cherokee, Rush	1878
1902	Busby, Chas. D., Brooklyn, Marion Sims, St. Louis	1897
1899	Burd, Edwin, Lisbon, Univ. of Penn	1871
1897	Burrows, F. A., Kiron, S. U. of Iowa	1887
1890	Burt, C. I., Davenport, P. & S., Keokuk	1887
1868	Caldwell, T. J., Adel, P. & S., Keokuk	1863
1897	*Caldwell, S. A., Little Sioux, N. W. M., St. Jo	1886
1902	Callahan, B. J., Des Moines, Jefferson Medical	1900
1898	Campbell, H. E., Anita, Univ. Med. N. Y	1891
1891	Carhart, G. L., Marion, Albany Medical	1848
1899	Carpenter, Geo. P., Cedar Rapids, Med. Col. of Ohio	1868
1902	Carpenter, M. C., Fairfield, Rush Medical	1882
1899	Carson, A., Elliott, Rush Med. Col	1890
1901	Cantwell, J. D., Davenport, S. U. I	1901

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1900 Carver, W. F., Fort Dodge, H. C. M., Louisville....1893
1901 Chapman, H. R., Bennett, S. U. I., Muscatine Co....1890
1895 Chapman, R. R., Bridgewater, Rush Medical.....1894
1894 Chapman, R. U., Des Moines, Iowa P. & S.....1892
1891 Chase, C. S., Waterloo, Rush Medical.....1882
1902 Childs, R. F., Audubon, Omaha Medical.....1897
1901 Chittum, J. H., Wapello, Keokuk Medical.....1897
1896 *Churchill, C. H., Fort Dodge, Rush Medical.....1886
1899 Cilley, C. S., What Cheer, S. U. I.....1897
1872 *Clapp, Elmer F., Iowa City, Bellevue Hos.....1870
1893 Clark, J. F., Fairfield, Univ. of Penn.....1889
1875 Clark, E. W., Grinnell, Rush Medical.....1871
1887 Clark, R. D., Akron, Rush Medical.....1875
1887 Clark, S. W., Oskaloosa, S. U. of Iowa.....1886
1901 Clegg, Christina L., Columbus Jct.....1897
1901 Clegg, J. W.. Columbus Jct., P. & S., Keokuk.....1896
1894 Claybaugh, J. P., Creston, Rush Medical.....1883
1888 Cobb, E. A., Harlan, Charity Hospital.....1868
1883 *Cokenower. J. W., Des Moines, Louisville Medical..1880
1900 *Colby, M. E., Clear Lake, W. H. M. C., Chicago....1884
1889 Cole, A. J., Britt, Rush Medical.....1883
1891 *Cole, J. F., Oelwein, S. U. of Iowa.....1887
1896 *Cole, J. H.. Council Bluffs, P. & S., Chicago.....1892
1901 Cole, F. M., Battle Creek, N. W. Univ., Chicago....1898
1895 Cole, T. C., Thurman, P. & S., Keokuk.....1878
1902 Conkling, W. S., Des Moines, P. & S., Des Moines..1897
1895 *Conn, C. E., Battle Creek, S. U. of Iowa.....1895
1895 *Conn, J. E., Ida Grove, S. U. of Iowa.....1892
1901 Conner, F., Reinbeck, Ohio Med.....1890
1887 *Conniff, R. E., Sioux City, S. U. of Iowa.....1884
1901 Cooling, W. A., Wilton Junction, Rush Med.....1898
1900 Cook, C. P.. Otley, P. & S., Keokuk.....1898
1900 *Cook, C. E., New London, Rush.....1897
1896 Cornell, C. W., Knoxville, Rush Medical.....1871
1901 Costello, Wm., Zwingle, S. U. I.....1894
1899 Cottam, G. G., Rock Rapids, Marion Sims, St. L....1893
1891 Cottle, C. C., Marshalltown, Rush Medical.....1889
1899 Coulter, A. B., Cedar Rapids, Penn. Univ.....1882

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1893 Coulter, J. H., Summitsville, P. & S., Keokuk.....1890
1896 Coveney, M. A., Clinton, S. U. I. Medical.....1892
1878 Cox, J. B., Belle Plaine, P. & S., Keokuk.....1865
1899 Craig, Jas A., Keosauqua, Jefferson Med. Col.....1895
1896 Craig, J. W.. Lohrville, P. & S., Keokuk.....1881
1899 Craig, N. S., Manchester, Bellevue Hospital.....1871
1898 Cram, F. M., Sheldon, Rush Medical.....1878
1896 Crawford, A., Mt. Vernon, Rush Medical.....1883
1884 Crawford, G. E., Cedar Rapids, Bellevue.....1879
1891 *Crawford, J. P., Davenport, S. U. of Iowa.....1883
1895 Cresap, R. N., Bonaparte, Kansas City Med.....1885
1902 Cretzmeyer, C. H., Algona, Univ. of Iowa.....1901
1872 Criley, B. H.. Dallas Center, Jefferson Medical.....1871
1892 Crosby, J. F., Menlo, P. & S., Chicago.....1889
1873 *Crouse, D. W., Waterloo, Long Island Med.....1869
1890 Crouse, E. A., Grundy Center, Univ. of Penn.....1870
1899 Cunningham, J. W., Clarksville, S. U. I.....1897
1903 Dales, J. A., Sioux City, Rush.....1890
1903 Dahms, O., Davenport, Rush.....1900
1890 Davidson, R. R., Winterset, Rush Med. Col.....1890
1897 Daubney, F. W., Decorah, S. U. of Iowa.....1883
1903 Dean, F. W., Council Bluffs, Univ. Minn.....1890
1899 Dean, H. J.. Muscatine, Jefferson Med.....1890
1875 Dean, H. M., Muscatine, P. & S., N. Y.....1861
1901 *Dean, W. W., Sioux City, Omaha Medical.....1895
1898 Dean, L. W., Iowa City, S. U. of Iowa.....1896
1901 De Armand, J. A., Davenport, Univ. of Penn.....1876
1872 Deering, A. A., Boone, Maine Medical.....1868
1901 Decker, G. E.. Davenport, S. U. I.....1897
1900 *Deering, A. B., Boone, N. W. Univ., Chicago.....1898
1899 Dennison, J. C., Bellevue, S. U. of Iowa.....1889
P. & S., Keokuk.....1879
1885 Devine, J. H., Sioux Rapids, Bellevue Medical.....1883
1897 Devine, W. S., Marshalltown, S. U. of Iowa.....1887
1900 Desmond, T. F., Webster City, Rush.....1895
1895 DeWitt, C. H., Glenwood, P. & S., Chicago.....1883
1901 Diamond, S. B., Albany, Ills., S. U. I.....1889
1894 Diehl, C. E., Valley Junction, S. U. of Iowa.....1893

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1899 Dihel, T. E. K., Oakville, Univ. of Louisville.....1893
1897 *Doan, H. C., Humboldt, Univ. Mich.....1884
1901 Dodds, W. E., Richland, Rush Med.....1885
1902 Donnelly, William, Ryan, Bellevue Hosp. M. C.....1883
1900 Doolittle, E. W., Garden Grove, S. U. I.....1875
1891 Doolittle, J. C., Independence, Rush Medical.....1887
1891 *Dorr, E. E., Des Moines, S. U. of Iowa.....1889
1893 Dorsey, F. B., Keokuk, P. & S., Keokuk.....1881
1888 Doty, E. A., Oxford, S. U. of Iowa.....1885
1900 Downs, Ed., Coon Rapids, S. U. of Iowa.....1885
1902 Downs, J. A., Glidden, U. of Iowa.....1897
1898 Downing, W. L., Moulton, Rush Medical.....1886
1902 Doyle, J. M., Neola, Victoria Univ.....1892
1896 Drennan, D. D., Corydon, Rush Medical.....1890
1897 Duffield, H. P., Marshalltown, Rush Medical.....1870
1894 *Dudley, E., Paulina, Rush Medical.....1886
1902 Earnest, W. H., Seymour, Med.-Surg., Cincinnati...1870
1903 Edgar, J. C., Holstein, P. & S., Baltimore.....1881
1903 Efner, Bessie L., Hinton, Sioux City M.....1902
1900 *Eichelberger, Agnes, Sioux City, N. W. Univ.....1888
1900 Eiker, B. L., Decatur, Rush Medical.....1896
1892 Eiskamp, G. H., Washington, P. & S., Keokuk.....1892
1896 Elmer, A. W., Davenport, Univ. of Penn.....1886
1902 *Ely, F. A., Des Moines, S. U. I.....1898
1903 Ely, W. E., Ocheyedan, Univ. Mich.....1885
1903 Ellis, Geo. V., Akron, Omaha M. C.....1882
1895 Embree, Ed., Winterset, S. U. of Iowa.....1889
1892 Emery, H. G., Norwalk, Univ. of Mich.....1889
1875 Emmert, J. M., Atlantic, Jefferson Medical.....1872
1884 Enfield, Chas., Jefferson, P. & S., N. Y.....1869
1900 Engle, H. P., Newton, S. U. of Iowa.....1898
1900 Engle, Perry, Newton, Univ. of Mich.....1871
1896 Engle, Theo., State Center, Missouri Med.....1885
1884 *Eshbaugh, H. C., Albia, Univ. of Penn.....1883
1899 *Evans, J. G., New Hartford, S. U. of Iowa.....1893
1879 Evans, O. E., Gowrie, P. & S., Keokuk.....1879
1902 Evans, R., Fort Dodge, Detroit C. of M.....1888
1874 Fairchilds, D. S., Des Moines, Albany Med.....1868

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1898 Farlow, S. J., Farnhamville, I. Col. P. & S.....1893
1892 *Farnsworth, D. W., Galva, S. U. of Iowa.....1885
1882 Farr, H. S., Madrid, S. U. of Iowa.....1881
1902 *Farquhar, E. M., Early, P. & S., Chicago.....1897
1894 Fellows, C. D., Algona, Keokuk Medical.....1892
1897 Field, G. W., Humboldt, Chicago Medical.....1875
1902 Field, G. A., Callender, Trinity Med., Toronto, Can..1898
1898 Findlay, W. J., Sac City, N. W. Med., Chicago.....1894
1884 Finlayson, D. W., Des Moines, Univ. Mich.....1875
1896 *Finlayson, J. A., Armstrong, Kentucky School.....1892
1903 Fisher, E. E., Rodney, Sioux City C. of M.....1898
1902 Flannery, Jos. J., Des Moines, I. C. P. & S.....1900
1896 Flynn, Chas. H., Postville, Keokuk Medical.....1871
1886 Fordyce, Oscar, Guthrie Center, P. & S., Chicago...1885
1895 Fordyce, W., Fairfield, P. & S., Keokuk.....1875
1882 *Fosnes, Edith G., Des Moines, Women's Phil.....1878
1902 Fountain, C. B., Valley Junction, S. U. of Iowa.....1891
1891 Foxworthy, O. W., Leon, P. & S., Keokuk.....1884
1902 *Fraser, Walter, Corwith, Marion Sims C. of M.....1893
1881 Frederick, Mary D., Fort Dodge, P. & S., Keokuk..1884
1886 French, L., Davenport, Berkshire Medical.....1853
1903 Fry, Wm. N., Marcus, Univ. Vermont.....1887
1900 Fuller, Q. C., Milford, I. C. P. & S.....1892
1900 Fuller, Z., Sac City, S. U. of Iowa.....1876
1886 Fuller, Geo. H., Delhi, Chicago Medical.....1869
1900 Gahringer, J. M., Olds, C. P. & S., Keokuk.....1896
1903 Gamble, James, Le Claire, Mo. M. C.....1847
1903 Garner, J. E., Sioux City, S. U. I.....1889
1900 Gardner, Paul E., New Hampton, S. U. of Iowa....1896
1897 *Gardner, Ira K., New Hampton, Univ. of Mich.....1870
1900 Garth, J. W., Clarion, P. & S., Chicago.....1899
1879 Getz, H. L., Marshalltown, Jefferson Medical.....1877
1903 Giles, G. C., Marne, Queen's University.....1893
1903 Gillespie, H. S., Mapleton, Omaha M. C.....1898
1902 *Glann, F. W., Holly Springs, Sioux City M. C.....1898
1903 Glynn, C. E., Davenport, Phys. & Surg., Chicago....1902
1896 Gockley, A. S., Carroll, New York Medical.....1880

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1897 Goss, E. L., Carrington, N. D., P. & S., Chicago... 1892
1894 Graham, C. C., Baxter, S. U. of Iowa..... 1884
1896 Graham, J. C., La Porte, Bellevue..... 1874
1899 Graham, J. DeWitt, Springville, Rush Medical..... 1891
1883 Graham, W. F., Atlantic, Rush Medical..... 1880
1899 Grant, Chas. S., Iowa City, S. U. of Iowa..... 1897
1899 *Gratiot, H. B., Dubuque, Jefferson Medical..... 1896
1895 Graves, D., Gilman, Univ. of New York..... 1871
1901 Gray, Clara, Talleyrand, P. & S., Keokuk..... 1896
1896 Gray, S. T., Albia, S. U. of Iowa..... 1889
1902 Gray, H. D., Newton, S. U. of Iowa..... 1900
1893 Greene, J. H., Dubuque, Buffalo Medical..... 1875
1902 Greenman, J. W., Leon, C. of M., Keokuk..... 1898
1877 Griffin, C. C., Vinton, Univ. of Mich..... 1868
1895 Griggs, R. C., Murray, Rush Medical..... 1871
1878 Grimmell, G. H., Jefferson, P. & S., Keokuk..... 1874
1898 Grimes, Eli, Des Moines, S. U. of Iowa..... 1897
1885 Grimes, W. S., Wapello, Rush Medical..... 1874
1887 *Guthrie, J. R., Dubuque, S. U. of Iowa..... 1884
1901 Hagebeck, A. L., Davenport, S. U. I..... 1889
1901 Hale, W. W., Des Moines, P. & S., Keokuk..... 1877
1899 Hall, E. T., Plano, Kentucky School..... 1893
1900 Hamilton, A. S., Independence, Univ. of Penn..... 1897
1885 Hamilton, C. H., Dubuque, Rush Medical..... 1873
1901 Hamilton, C. M., Thornburg, P. & S., Keokuk..... 1897
1899 *Hamilton, John, Cedar Rapids, Univ. of Penn..... 1896
1869 Hanawalt, G. P., Des Moines, Georgetown Univ.... 1864
1902 Hancock, John C., Dubuque, M. S. Harvard Univ.. 1898
1886 Hanna, Rebecca, Red Oak, S. U. of Iowa..... 1874
1899 Hanna, J. W., Winfield, S. U. of Iowa..... 1873
1896 Harding, L. W., Solon, S. U. of Iowa..... 1890
1903 Harney, L. J., Storm Lake.....
1896 Harriman, J. W., Iowa City, S. U. of Iowa..... 1891
1896 Harriman, W. E., Ames, Jefferson Medical..... 1895
1900 Harrison, J. W., Guthrie Center, S. U. of Iowa..... 1896
1902 Harper, J. A., Greenfield, Bellevue H. Med., N. Y... 1896
1895 Hasty, J. F., Murray, S. U. of Iowa..... 1889

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1896 Hatfield, Geo. E., Lacona, Rush Medical.....1892
1902 Hathaway, L. B., Reinbeck, Rush Medical.....1878
1902 Hay, George W., Washington, S. U. of Iowa.....1894
1867 Hazen, E. H., Des Moines, Charity Hospital.....1866
1899 Hejinian, A. G., Anamosa, Rush Medical.....1893
1901 Hender, A. B., Davenport, S. U. I.....1901
1900 Henderson, E. B., Marengo, S. U. of Iowa.....1897
1899 Henry, J. D., Hedrick, Bellevue Med.....1889
1902 Henry, R. V., Hedrick, John A. Creighton Med....1901
1895 Herrick, J. F., Ottumwa, Keokuk Medical.....1891
1898 Herren, D. V., Blockton, Miss. Med.....1867
1885 Hester, F. E. L., Glenwood, Missouri Med.....1883
1902 Hews, L. D., Rockwell City, P. & S., Chicago.....1901
1902 Hews, R. H., Rockwell City, Univ. of Buffalo.....1894
1894 *Hibbs, G. B., Mitchellville, P. & S., Chicago.....1889
1903 Hileman, Earnest, Ida Grove, P. & S., Chicago.....1901
1877 *Hill, G. H., Des Moines, Rush Medical.....1874
1891 Hill, M. W., Iowa Falls, P. & S., Keokuk.....1881
1881 Hill, Nancy M., Dubuque, Univ. of Mich.....1874
1897 Hill, R. W., Davenport, S. U. of Iowa.....1883
1903 Hinzenga, F. J., Rock Valley, Rush.....1895
1872 Hobby, Cisero M., Iowa City, Bellevue Hos. M. C..1870
1888 *Hobson, A. J., Hampton, S. U. of Iowa.....1884
1899 *Hobson, Thos. A., Parkersburg, S. U. of Iowa.....1889
1903 Hoefer, E. A., Reinbeck, Mo. M. C.....1898
1891 Hoering, G. P., Walnut, S. U. of Iowa.....1888
1898 Hoff, A. W., Des Moines, Iowa Col. P. & S.....1885
1902 *Hoffman, C. H., Des Moines, Univ. of Heidelberg..1888
1890 *Hogle, K. A., Mt. Vernon, N. W. Univ., Chicago...1885
1879 Holliday, J. W., Burlington, P. & S., Keokuk.....1869
1902 Horne, William, Mt. Ayr, N. W. Univ., Chicago....1866
1888 Hornibrook, E., Cherokee, Univ. of Victoria.....1861
1895 Hooper, M. L., Milo, P. & S., Keokuk.....1891
1903 Hostetler, C., Marcus, Sioux City C. of M.....1898
1891 Hostetter, J. I., Colo, Chicago Medical.....1880
1895 Howe, J. E., Greenfield, P. & S., Keokuk.....1873
1901 Howe, J. M., Rochester, S. U. I.....1897
1901 Hull, Henry C., Washington, N. W. Univ., Chicago.1898

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1897 Hull, J. H., Washington, Bellevue.....1875
1902 Hunter, H. C., Sheffield.....1888
1880 Hunter, H. E., Newton, Western Rerserve.....1869
1899 Hunter, W. W., Monticello, S. U. of Iowa.....1886
1903 Hutchins, J. H., Hampton, Rush.....1871
1891 Irish, H. R., Forest City, S. U. of Iowa.....1883
1893 Jackson, D., Pleasantville, Kentucky Medical.....1865
1895 *James, Chas. S., Centerville, Univ. M. C. K. C.....1891
1892 James, C. E., Durham, Col. P. & S.....1880
1903 Jappe, C. F., Davenport, S. U. I.....1895
1902 Jay, D. A., Eldon, P. & S., Keokuk.....1890
1885 Jenkins, E. R., Washington, Missouri Medical.....1866
1869 *Jenkins, Geo. F., Keokuk, Missouri Medical.....1866
1887 Jepson, Wilhelm, Sioux City, S. U. of Iowa.....1886
1884 Jewell, P. M., Decorah, Univ. of Michigan.....1873
1899 Jewell, R. T., Urbana, S. U. of Iowa.....1892
1897 *Jennings, H. B., Council Bluffs, P. & S., Keokuk...1882
1901 Johnson, A. H., Cedar Rapids, Rush Med.....1878
1884 *Jones, N. J, Shelby, S. U. of Iowa.....1883
1886 Jones, U. C., Breda, P. & S., Des Moines.....1885
1897 Johnston, E. U., Fredericksburg, S. U. of Iowa.....1895
1894 Jonsson, C., Clinton, Col. of Iceland.....1888
1883 Joor, Peter, Maxwell, S. U. of Iowa.....1881
1896 Jungblut, H. C., Tripoli, Bellevue.....1891
1902 Keables, B. F., Pella, Rush.....1890
1898 Kegel, Ernest T., Walcott, S. U. of Iowa.....1896
1903 Keith, Katheryn Miss, Panora, N.W.U.Woman's M.1894
1898 Keith, W. K., Fontanelle, Rush Medical.....1894
1890 Kelleher, T. F., Des Moines, S. U. of Iowa.....1878
1898 Kelly, B. C., Carroll, Hahnemann.....1887
1901 Keogh, J. V., Dubuque, Univ. of Penn.....1899
1885 *Kempker, J. F., Lacona, P. & S., Keokuk.....1885
1901 Kemmerer, C. F., Eldridge, S. U. I.....1878
1894 Kenefick, M. J., Algona, Rush Medical.....1892
1901 Kemmerer, T. W., Iowa City, S. U. I.....1901
1869 Kennedy, J. F., Des Moines, Univ. of N. Y. City....1848
1902 Kern, L. C., Waverly, Univ. of Iowa.....1895
1900 *Kester, G. W., Grand Junction, Col. P. & S.....1896

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1892 Kessell, Geo., Cresco, Rush Medical.....1885
1895 Kessler, A., Carroll, Kentucky Hosp.....1888
1886 Kessler, J. B., Iowa City, S. U. of Iowa.....1887
Bellevue.....1883
1898 Kiehl, F. W., Waterloo, Rush Medical.....1886
1897 Kierhulff, B. F., Marshalltown, S. U. of Iowa.....1890
1902 Killingsworth, B. H., Clarinda, M. D. Drake Univ..1888
1903 Kimbel, Clara L., Bloomfield, Keokuk M. C.....1892
1899 Kimball, C. B., West Liberty, S. U. of Iowa.....1874
1885 Kime, J. W., Fort Dodge, S. U. of Iowa.....1883
1900 *King, A. D., Des Moines, S. U. of Iowa.....1879
1895 King, A. E., Blockton, P. & S., Keokuk.....1881
Louisville Hospital.....1894
1881 King, E. H., Muscatine, Detroit Medical.....1870
1888 Kinnier, W. H., Dubuque, Albany Medical.....1870
1901 Kinnier, Lily, Dubuque, N. W. Univ., Chicago.....1898
1901 Kulp, J. H., Davenport, S. U. I.....1872
1897 Kinney, Geo., Burlington, Rush Medical.....1886
1901 Klein, J. L., Muscatine, S. U. I.....1897
1893 Kirkendall, E. E., W. Burlington, S. U. of Iowa....1885
1901 Kirkpatrick, J. W., Wyoming, Rush Medical.....1888
1894 *Knott, V. B., Sioux City, Columbia University.....1893
1901 Knox, John, Princeton, Univ. of Penn.....1878
1885 Krejci, J. C., Sioux City, Vienna, Austria.....1862
1903 Kulp, O. W., Davenport, S. U. I.....1896
1883 Lacey, T. B., Council Bluffs, Chicago Medical.....1875
1895 La Force, B. D., Ottumwa, Rush Medical.....1893
1892 *La Force, W. B., Ottumwa, Chicago Medical.....1891
1881 La Grange, J. W., Marion, Rush Medical.....1875
1890 Lakin, A. M., Yale, Rush Medical.....1884
1896 *Lapsley, R. M., Keokuk, Rush Medical.....1891
1901 Langan, J. C., Clinton, Rush Medical.....1891
1882 Layton, H. R., Leon, P. & S., Keokuk.....1876
1901 *Lambach, Frederick, Davenport, Univ. Penn.....1887
1897 Lawrence, E. J., Cainsville, Mo., I.C.P.& S., Mo. Med.1889
1902 *Lawson, T. J., Ute, Omaha Medical.....1896
1899 Lehan, J. W., Dunlap, Rush Med. Col.....1897
1893 Liepziger, H. A., Burlington, Bellevue.....1881

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1900 Leonard, F. C., Boone, I. C. P. & S.....1897
1884 LeRoy, H. C., Des Moines, Univ. Victoria.....1857
1900 Lesan, C. T., Mt. Ayr, Rush Medical.....1897
1898 Lessenger, W. S., Mt. Pleasant, S. U. of Iowa.....1890
1902 Lewis, Eugene Richards, Dubuque, Univ. of Penn..1899
1881 Lewis, J. S., Dubuque, Jefferson Medical.....1868
1903 Lindley, C. F., Davenport, Rush.....1885
1899 Lindsay, J. J., Manchester, Bellevue Hos. M. C.....1883
1889 Little, Geo. B., Burlington, St. Louis Medical.....1885
1889 Little, F. H., Muscatine, S. U. of Iowa.....1879
1888 Littig, L. W., Iowa City, S. U. of Iowa.....1883
R. C. of S., Eng.....1887
Univ. of Penn.....1884
1896 Livingston, Hugh, Hopkinton, Rush Medical.....1890
1900 Long, E. C., Williamsburg, Univ. of Louis.....1890
1899 Loose, D. N., Maquoketa, Rush Medical.....1877
1890 *Louthan, B. S., Sutherland, Jefferson Medical.....1856
1875 Love, J. S., Springville, Jefferson Medical.....1856
1901 Lowery, O. W., Grand Junction, P. & S., Keokuk..1878
1883 Lytle, S. S., Iowa City, S. U. of Iowa.....1878
1882 Macrae, Donald, Council Bluffs, Edinburgh, Scot..1861
1895 Macrae, D., Jr., Council Bluffs, Univ. of Michigan..1891
1900 Maker, L. E., Sibley, I. C. P. & S.....1897
1899 Marner, W. A., Miles, S. U. of Iowa.....1885
1900 Matthey H., Davenport, Univ. of Heidelberg.....1887
1901 Matthey, C., Davenport.....1879
1884 *Maxwell, Thos. J., Keokuk, P. & S., Keokuk.....1861
1891 McAllister, Chas., Spencer, Berkshire Medical.....1865
1899 McAlvin, J. G., Grundy Center, S. U. of Iowa.....1897
1903 McCarthy, D. H., Davenport, Georgetown Univ....1899
1887 McCarthy, J. F., Dubuque, Minneapolis Hos.....1883
1896 *McCarthy, W. W., Des Moines, Iowa P. & S.....1893
1883 McCleary, H. C., Indianola, Rush Medical.....1881
1869 McCleary, J. D., Indianola, P. & S., Keokuk.....1867
1880 McClure, A. W., Mt. Pleasant, Univ. of Penn.....1860
1892 McClure, T. G., Douds, P. & S., Keokuk.....1878
1900 McConnaughey, W., Prairie City, C.P.& S., Keokuk.1883

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1899 McConkie, Jas. J., Ced. Rapids, Starl'g M., Col'mb's. 1864
1899 McConkie, W. A., Cedar Rapids, Univ. of Mich.... 1889
1883 *McCowen, Jennie, Davenport, S. U. of Iowa..... 1876
1900 *McCray, F. H., Schaller, Sioux City Med..... 1896
1902 McCray, W. R., Marble Rock, P. & S., Chicago.... 1900
1900 McCreight, A. H., Ft. Dodge, Rush Medical..... 1897
1902 McCulloch, George, Humeston, Rush Medical..... 1873
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